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U.S. Telephone Industry — An Update

The following special comment brings up to date the comprehensive industry outlook published in December 1995.

Opinion

For some time the U.S. local telephone industry has been actively supporting structural changes that would substitute free market forces for traditional regulatory oversight. These efforts bore fruit in the passage of the Telecommunications Act of 1996. But the industry has also recognized that along with the legislative change, there must be a transformation of the mind-set, focus, methods, and practices of the telephone business if it is to succeed in this new competitive environment.

In the future, the industry will remain a provider of premium-priced, value-added services. Prices for basic service will be set at market levels. Competition will very rarely focus on price alone, but will center on responsiveness to customer requests, service quality, and service selection. Pricing will be based on strategic need, not cost accounting issues. Historical cross-subsidies between services—whether between business and residence, urban and rural, access and basic exchange, or toll service and basic exchange—will need to be eliminated. Resale of local services will become a fact of life. Bundling and branding of services will be more prevalent than today. New service development will receive increased emphasis as a competitive differentiator.

Regulatory, political, and judicial issues will remain sources of concern. While legislation will provide generic guidelines to the industry's future, efforts to assure that the new laws are interpreted favorably will continue to require significant management resources. The move from traditional rate of return regulation to alternative regulatory forms focused on price of service will need to be addressed further. Capital recovery, the conditions of competitive entry, interconnection agreements, mutual compensation, the pricing for unbundled network services, dialing parity, and the competitive checklist issues are not all black and white but rather shades of gray that are subject to differing points of view.

Operationally, the industry has already moved from a culture focused on network quality to one targeted on meeting customer expectations. Emphasis on customer service issues will continue in the future as the employee base shifts to sales, marketing, and service functions from network skills. While the industry can be expected to substitute technology, with its declining costs, for increasingly costly labor, the wholesale downsizing activities of the past are likely at an end.

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Importantly, however, the law does require that as state regulators proceed down their individual paths, they establish regulation that is consistent with the intent of the act and the FCC.

The Local Operating Environment

As the Bell holding companies begin to take advantage of the liberties that the law provides, we believe that the risks associated with this legislation may have a greater impact on ratings than the opportunity to compete in new lines of business, or to share in new sources of revenue. The principal threat that may develop will be to the financial performance of their largest subsidiaries, the telephone operating companies, with the opening of the local loop to alternative carriers.

To foster an environment of competitive choice, the law establishes certain obligations for the incumbent local exchange carriers in providing access to the local network. These include the requirement for the resale of telecommunication services, number portability, dialing parity, access to rights of way, and reciprocal compensation. Additionally, the companies are to negotiate in good faith with the new carriers, to provide for a quality of interconnection to the local networks that is similar to what the incumbent telephone companies now enjoy, to unbundle network elements, to offer resale services at wholesale rates established by the state commission, and to provide for physical co-location of facilities when requested. The details implementing all of these issues were the subject of the FCC's Interconnection Order issued in August 1996.

Operating agreements based on direct negotiations between the incumbents and the new entrants are encouraged by the Telecom Act. While there is no time limit for concluding these negotiations, the state regulatory commission can step in to end disputes. Either party can petition for arbitration between the 135th and the 160th day of company negotiation. The state then has another 110 to 135 days to resolve the dispute and approve the agreement. The general idea here is to get on with competition, open the local loop as soon as possible and not allow the process to drag on through a two- or three-year period, as occurred in New York and Illinois. Under the timetable established by the law, all states will be required to open the local telephone network to competition by May 8, 1997.

The financial consequence of implementing competition is not likely to be significant. The law does provide for cost-based pricing of services and network elements; and the discount factor for the resale of local service is to incorporate the avoidable costs at the telephone company for items such as marketing, billing, and collection expenses. As a result, the financial loss associated with providing market access will likely be minimal. Affecting this assessment is the concern that the law does not require the incumbent carriers to earn a reasonable profit on these services. Nonetheless, state regulators may allow for a reasonable profit and we will be watching these decisions closely to benchmark the development of a level playing field.

IMPLEMENTATION

To meet the intent of the Telecom Act, three major regulatory initiatives covering the restructuring of the industry are necessary. These will establish the terms and conditions under which new competitors are to interconnect to the incumbent carriers' local network; will define and establish support mechanisms for the continuation of the principle of universal service; and will review the existing access charge structure by which long-distance carriers are charged by the local telephone companies for the ability to originate and terminate traffic on the local network. The FCC has issued an order covering the interconnection question; a federal-state joint board has published some recommendations covering the universal service issue; and formal recommendations have yet to be published on the access charge question. Orders are expected by May 8, 1997 on both universal service and access charges.

Plain Talk on the Future of Communications

C. Michael Armstrong
Chairman & CEO, AT&T
Remarks to
The Economic Club of Detroit
Detroit, Michigan
September 29, 1998

Thanks, Ed (McNamara), for that kind introduction and welcome home. This city brings back many fond memories. Particularly since my Dad is with me today.

Detroit is a great sports town and I grew up with a loyalty that remains in our family for the Tigers, the Lions and the Red Wings. In fact, I was convinced that baseball was my sport, until I met a curve ball – or rather, regularly missed a curve ball, from a pretty good pitcher named Milt Pappas, who had a terrific major league career.

I was equally convinced at Redford High School that the 100 to 220 in track would be my calling, until a fellow named Carr won everything in town and went on to gold in the Olympics.

But it was football that filled my thoughts, dreams and weight room in the mid-50s. And with scholarship offers, I was convinced my high school girlfriend would be joining me at the university of my choice.

However, her father, a GM executive, had a different outlook. He called me into his living room and advised me that we would not be going to the same university because it was highly likely that I would end up selling popcorn in Tiger Stadium.

Well, I've been married to that girlfriend for 37 years, my father-in-law became one of my best friends and GM eventually hired me to work at Hughes.

In any case, it's always a special privilege to be the guest of the Economic Club of Detroit. This forum is without doubt one of the country's preeminent platforms for public debate, for discussion that sets the agenda for change. For that reason, I am pleased to have the opportunity to speak about an issue that is not only challenging my industry – but changing our lives. I'm talking about the telecom revolution: the combination of converging technologies and regulatory reform that will change the way we think of such commonplace concepts as distance and place.

Of course, high tech debate is often conducted in a language all its own, leaving us to separate the bits and bytes, and RAM from ROM.

My aim today is to engage in plain talk about the future of telecom – about issues often obscured by technical terms, legal conditions and industry jargon. I would like to describe how (1) AT&T is investing for more consumer choice and value; (2) that there should be a huge consumer tax reduction in our future; and (3) that the merger of Bell monopolies is not in the consumers interest and should be denied.

As an industry, the communications business is booming with innovation, excitement and change.

- Industry growth is projected at 8 to 10 percent, three to four times the growth of the economy.
- Commerce on the Internet, barely a blip a few years ago, could surpass $300 billion by 2002.
- Wireless phones have gone from being a novelty to a necessity.

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One million Americans sign up for wireless service every month – not only for convenience, but also for security. In fact, we heard Governor Engler's call to help secure the safety of Michigan's social workers and AT&T will donate 100 wireless phones and free local air time to the Michigan Family Independence Agency.

To give you a sense of how far and how fast technology now penetrates our everyday lives, consider these benchmarks.

It took radio 30 years to reach 50 million people. It took 13 years for TV to do the same. But the World Wide Web reached twice as many users in half the time. Today, more than 100 million of us have logged on to the Internet and experts project 250 million Internet users, around the world just four years from now.

What are these technological trend lines telling us at AT&T? Let me start with a tale of two purchases.

A colleague of mine bought a new car recently. For reasons of Detroit diplomacy – I won't say what he bought, but he did all the things a smart car buyer's supposed to do. He checked out the features. He went over all the options. He shopped around for the best price. And finally he bought the car.

The one thing he didn't do was visit a dealer showroom. At least not until he was ready to pick up the car. Everything else he did over the Internet.

The second purchase I have in mind had a slightly higher sticker price than the one on the window of my colleague's new car. It's AT&T's $48 billion acquisition of TCI, the nation's second largest cable TV company.

What's the connection between my colleague's new car and AT&T's purchase of TCI? What made both possible was the Internet.

No – I didn't email my bid to John Malone, or go looking for companies to buy by logging onto MegaMerger.Com. What I mean is that neither that car purchase nor the AT&T/TCI merger would have been possible without something called the Internet Protocol – or IP. That's the common standard that lets different computer systems, operating systems and software speak to one another electronically.

IP technology means that if a television signal, a phone call and a computer file are all digital, there's no reason to confine them to separate lines. It is literally erasing the boundaries between television sets, telephones and computers. And between those industries.

The IP standard gives the telecom industry a technological freedom that didn't exist just a few years ago. And we'll put it to good use as we team up with TCI.

Consider the way it will help AT&T become the first major long-distance carrier to break into the local consumer phone market. Up to now – and in spite of the best efforts of the regulators and legislators in Washington – the local phone companies' monopoly has proved hard to break.

How hard? Well, AT&T spent $3 billion dollars to break into local phone markets. What did we get to show for it?

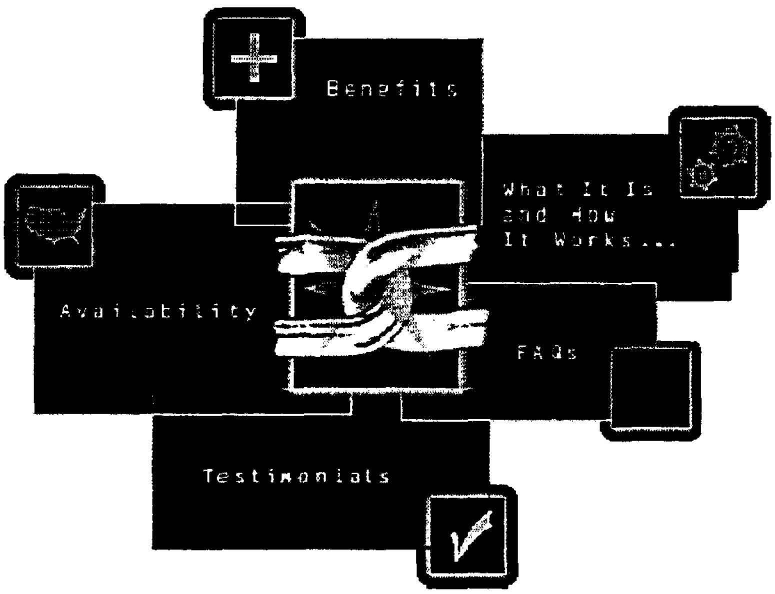
About half of all consumers who picked an alternative to their local phone company chose AT&T – a total of over 400,000 customers. Unfortunately, we could only serve them by "re-selling" the local phone company's service at a wholesale discount that didn't leave much margin for selling, provisioning and service costs – much less room for price competition. Not too surprisingly, AT&T

BUSINESS HOME)
AT&T DIGITAL LINK HOME)
WHAT IT IS...)
BENEFITS)
FAQS)
AVAILABILITY)
TESTIMONIALS)
LOCAL SERVICE)

AT&T SERVICES)
HELP / SEARCH)
WRITE TO US)
AT&T HOME)

AT&T Digital Link Service

*Your Long-Distance Relationship
Just Got a Lot Closer to Home*



AT&T Digital Link Service – A New Way to Make the Most of Your AT&T Relationship

Everyone knows AT&T is the leader in long-distance telephone service. With the passage of the Telecommunications Act of 1996, your business can choose AT&T quality and reliability for outbound local calls. How? AT&T Digital Link Service, a powerful new offer from AT&T that can benefit your business with every call you make.

AT&T Digital Link Service can deliver your outbound local calls using existing or new dedicated digital access facilities, making your local calling as convenient and trouble-free as your AT&T long-distance service. AT&T Digital Link Service is simple, reliable, and cost-effective – it's the next step to getting the most from your AT&T relationship.

Please note: If you are a **business** customer with existing or new access to the AT&T Network of T1.5 speed or greater, check out the great stuff on this site.

If you are not a **business** customer with T1.5 access or greater, you may want to explore AT&T's outstanding Local Service offers.

Comments or questions

AT&T Business Home Page
What It Is ... Benefits

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AT&T Digital Link Service

Availability

AT&T DIGITAL LINK HOME) ·
WHAT IT IS...) ·
BENEFITS) ·
FAQS) ·
AVAILABILITY) ·
TESTIMONIALS) ·

AT&T SERVICES) ·
HELP / SEARCH) ·
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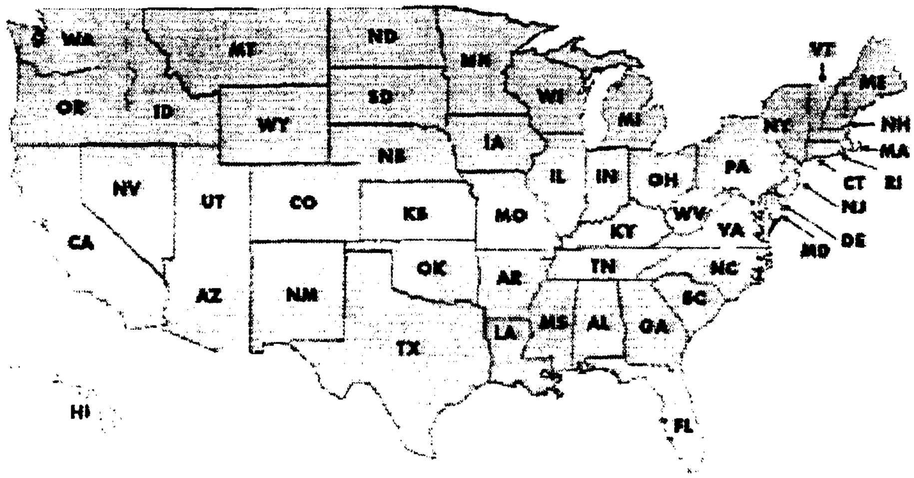
AT&T HOME) ·

AT&T Digital Link Service is currently available in 50 states except Alaska.



States with AT&T Digital Link Service

Comments or questions

AT&T Digital Link Service What It Is ... Benefits
FAQs ________ Testimonials

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AT&T Widens Local-Service Phone Plans

By REBECCA BLUMENSTEIN
Staff Reporter of THE WALL STREET JOURNAL

NEW YORK—Ma Bell is going back to its roots.

AT&T Corp. said it is stepping up plans to provide local telephone service to millions of consumers nationwide through the cable lines it is acquiring as part of its purchase of cable giant **Tele-Communications** Inc.

AT&T said it will spend $2 billion more than originally anticipated to accelerate plans to upgrade TCI's cable lines so they can provide local, Internet and advanced-video service by the end of this year in 10 markets. In a massive filing with the Securities and Exchange Commission, AT&T said it made a last-minute change against issuing a separate tracking stock for some of its consumer businesses. AT&T's board also authorized a 3-for-2 stock split, its first since 1964, and a $4 billion repurchase of AT&T's stock. AT&T's shares, which have been trading at historic highs, rose $2.8125, to close at $85.0625 in composite trading Friday on the New York Stock Exchange.

Separately, AT&T said it would earn more than previously expected in 1999, despite continued declines in its long-distance core. Excluding the TCI deal, valued at $32 billion when it was announced, AT&T said that in 1999 it expects to earn between $4.20 and $4.30 a share from its continuing operations. Previous estimates were about 5% lower. The company added that the TCI deal would reduce its earnings by about $1 per share. TCI said it expects pro forma revenue for its cable operations to grow in the mid-to-high single digits in 1999. (The value of the TCI deal has risen, because of AT&T's recent stock rise, to $40.9 billion, excluding $11 billion of debt.) AT&T said it has signed separate agreements with five small cable companies that will add five million potential customers. AT&T currently provides long-distance service to about 65 million customers.

Denver-based TCI holds an equity interest in each of the companies with which AT&T struck joint-venture agreements: **Bresnan Communications, Falcon Cable TV, Insight Communications, InterMedia Partners** and **Peak Cablevision.**

AT&T executives also told analysts at a meeting in New York that the company is moving to offer customers all of its services—from long-distance and local calling to cable movies—in one-price bundles for a set amount each month. People close to the company said it has begun to test such a program in Fremont, Calif. Also, AT&T said to analysts it will step up efforts nationwide to reward consumers who subscribe to its services with a loyalty program that provides increasing awards

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Risk and Return: A Revisit Using Expected Returns

Felicia Marston and Robert S. Harris**

Abstract

This paper uses direct estimates of expected returns to examine the link between standard measures of financial risk and investor return requirements. The results show that systematic risk commands a significant positive risk premium, much larger than found using historical returns as proxies for expectations. Furthermore, there are nonlinearities in the relationship between risk and return. Finally, we show that expected returns and risk premiums in the equity markets change over time and that these changes are related to changes in interest rates on U.S. government obligations.

Introduction

While theories of asset pricing are based on investor expectations, almost all empirical investigations employ returns actually realized over some historical period. Use of realizations has been the child of necessity since data on expectations have generally not been available. In this paper, we take advantage of financial analysts' forecasts to derive measures of expected return for over 400 stocks. The measures are updated monthly for the six-year period, 1982–1987.

These data are then used to test the link between investor expected returns and standard measures of financial risk. The results are compared to those obtained from the traditional method of using realized returns to proxy expectations, following the methodology of Fama and Macbeth [10] and Tinic and West [30]. The results thus provide further evidence on how empirical results

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are affected by choice of the proxy for expected returns. We also examine whether expected returns on stocks change over time and whether these changes are related to developments in the bond market.

The next section relates our approach to prior empirical work. Data and methodology are described in the following section. The next two sections present empirical results, and the paper ends with a summary and conclusions.

Realized Returns and Risk

Theory suggests that investors will demand extra return to compensate them for bearing incremental risk. Perhaps the most extensively used measures of risk in finance stem from portfolio theory and the two-parameter capital asset pricing model (CAPM). These risk measures distinguish between total and systematic (undiversifible) risk.

Empirical testing of the link between return and risk, however, has a long tradition of using realized returns. Such use requires the assumption that realized returns are a fair game, and hence, on average, realizations equal expectations (e.g., Fama and Macbeth [10] and Tinic and West [30]). While the assumption that realizations equal expectations may be true over long sweeps of history, it is not appropriate for most shorter time frames in a risky market. As a result, studies using realized returns require extremely long time periods and typically produce results that are quite sensitive to the subperiod studied. In early work using realized returns, Fama and Macbeth [10] conclude that expected returns increase with systematic risk, that the relationship between expected return and systematic risk is linear, and that nonsystematic risk is not related to returns. Even using Fama and Macbeth's methodology and extending it to more recent years, however, Tinic and West [30] could not support these three conclusions.

A primary obstacle for empirical work using expected, rather than realized, returns is obtaining a reasonable proxy for market expectations. Ang and Peterson [1] use Value Line projections of dividends and stock price to derive expected returns for use in tests of Brennan's [3] after-tax CAPM. Their work, however, relies on forecasts of a single analyst. In an effort to take advantage of larger and more comprehensive data sets on expectations, researchers have turned to financial analysts' forecasts of corporate earnings. Such forecasts are widely used by investors as evidenced by the commercial viability of services that provide such forecasts and by the results of studies of investors' behavior (Touche, Ross and Company [31] and Stanley, Lewellen, and Schlarbaum [28]). Moreover, research using consensus measures of earnings forecasts (typically a simple average of forecasts by individual analysts) demonstrates that such forecasts are incorporated in stock prices.[1]

Other research has translated earnings expectations into expected returns using the dividend growth model. Malkiel [21], Brigham, Shome, and Vinson [4], and Harris [16] derive risk premia for various market indices using this approach.[2] Friend, Westerfield, and Granito [12], Cragg and Malkiel [8], Linke, Kannan, Whitford, and Zumwalt [19], Marston [22], and Marston, Harris, and Crawford [23] use analysts' forecasts of long-term earnings growth in dividend valuation models to proxy expected returns. These returns are then related to measures of systematic and nonsystematic risk.[3]

Our work advances prior research by providing a direct examination of sensitivity of tests of the link between risk and return to use of earnings-based measures of expected return versus realized return. Unlike prior studies using forecast data, we use the traditional methodology of Fama-Macbeth [10] and apply it to both realized and expected returns. Such a procedure allows direct comparison to earlier work using the same methods on realized returns as well as a direct comparison of differences in results using expected returns as opposed to realized returns.[4]

Data and Methodology

Following prior research, we employ the dividend growth model to translate earnings forecasts into expected returns. Such use implicitly assumes that long-term growth in dividends is dependent on long-term growth in earnings. Estimates of expected return are calculated at monthly intervals using consensus financial analysts' forecasts (FAF) of five-year growth in earnings per share (g) in the dividend growth model:

$$\text{Expected Return} = \frac{Do(1 + g)}{Po} + g.$$

FAF are obtained from the Institutional Brokers' Estimate System (IBES). Each month, IBES provides mean estimates of earnings per share for the next year and up to four following years. In addition, IBES records analysts' projections of five-year growth rates in earnings per share. Mean values are calculated as the arithmetic average of forecasts by individual analysts.[5] Stock prices (Po) are obtained from Chase Econometrics, and the current indicated annual dividend (Do) is obtained from Compustat. Long-term (five-year) growth forecasts are only available after December 1981; thus, expected return measures are calculated for each of the 72 months from January 1982 through December 1987. Realized monthly returns (January 1982–December 1987) are obtained from the Center for Research in Security Prices (CRSP) for comparative purposes.

The sample is selected from firms in the Standard & Poor's (S&P) 500 Index and from a set of approximately 100 additional utility stocks followed by IBES. Given our use of the dividend growth model, the analysis is restricted to firms that pay dividends and have IBES forecasts of earnings growth. Additionally, to be included in the study, there must be at least three forecasts of earnings growth available for each stock. This latter screen is imposed to reduce measurement error associated with individual forecasts.[6] The final sample consists of approximately 400 firms for each of the seventy-two months (approximately 28,800 company months). Although our data do not allow analysis of the entire New York Stock Exchange (NYSE) as in Fama and Macbeth [10] and Tinic and West [30], our study is based on a large number of well-followed firms.

Following prior work, we examine the relationship of return to beta, beta squared, and residual (firm-specific) risk. To compare our results to earlier work, we replicate the methodology introduced by Fama and Macbeth [10] and used by Tinic and West [30].[7] For a given company in a given month, beta is estimated via the market model (using ordinary least squares) on the prior sixty months of data. Beta estimates are updated monthly and are calculated against both an equal- and value-weighted index of all NYSE securities. Firm-specific (nonsystematic) risk is proxied by the residual standard deviation from the regression used to estimate beta. While use of historical data to calculate risk measures implicitly assumes that such measures are stable over the estimation period, this stability assumption is much weaker than assuming expected returns are equal to realized returns. Furthermore, such risk estimates (e.g., beta) from historical data are widely used by investors and thus represent a risk proxy that investors may have available in pricing assets.

For each month, we aggregate firms into twenty portfolios (consisting of approximately twenty securities each). The advantage of grouped data is the reduction in potential measurement error inherent in independent variables at the company level. Portfolios are formed based on a ranking of beta estimated from a prior time period ($t = -61$ to $t = -120$). Portfolio expected (and realized) returns, beta, beta squared, and residual risk measures are calculated as the simple averages for the individual securities. (Descriptive statistics are provided in Table 1.)

Using these data, we estimate the following model for each of the seventy-two months:

$$R_{pt} = a_{0t} + a_{1t}\beta_{pt-1} + a_{2t}\beta^2_{pt-1} + a_{3t}S(e_{pt-1}) + U_{pt}, \quad p = 1 \ldots 20, \qquad (1)$$

where

R_{pt} = expected return for portfolio p in month t,
β_{pt-1} = portfolio beta, estimated over $t - 60$ to $t - 1$,
β^2_{pt-1} = portfolio beta squared,
$S(e_{pt-1})$ = portfolio residual risk, and
U_{pt} = a random error term with mean zero.

The model is then reestimated substituting monthly realized returns for expected returns. To replicate Tinic

TABLE 1

Sample Statistics: 1982–1987

For each of the 72 months (1982–1987), the sample companies are grouped into 20 portfolios. For each portfolio, an equally weighted average of characteristics is calculated. Means and standard deviations in the table are based on these 1440 portfolios (20 portfolios for each of 72 months).

Variable	Mean	Standard Deviation
Expected return	0.1635	0.0205
Historical return (annualized)	0.2007	0.2218
Long-Term Treasury note (yield)	0.1069	0.0206
One-month T-bill (annualized yield)	0.0780	0.0059
Beta (equal-weighted index)	0.8222	0.2511
Beta (value-weighted index)	0.9339	0.2552
Beta squared (equal-weighted index)	0.7930	0.4243
Beta squared (value-weighted index)	0.9373	0.4599
Residual risk (based on equal-weighted β)	0.0647	0.0090
Residual risk (based on value-weighted β)	0.0644	0.0094
Number of analysts	10.12	1.86

and West [30], we use return as the dependent variable rather than a risk premium formed by subtracting the risk-free rate. This procedure also allows us to avoid, at least initially, specifying the appropriate maturity for calculation of a risk-free proxy.

As a result of estimating regression (1) for each month, seventy-two estimates of each coefficient are obtained. Using realized returns as the dependent variable, the traditional approach (Fama and Macbeth [10], Tinic and West [30]) is to assume that realized returns are a fair game. Given this assumption, the mean of the seventy-two values of each coefficient is an unbiased estimate of the mean coefficient over that same time period if one could have actually used expected returns as the dependent variable. Note that if expected returns are used as the dependent variable the fair-game assumption is not required. Making the additional assumption that the true value of the coefficient is constant over the seventy-two months, a test of whether the mean coefficient is different from zero is performed using a t-statistic where the denominator is the standard error of the seventy-two values of the coefficient. This is the technique employed by Fama and Macbeth [10] and followed by Tinic and West [30].

If the traditional version of the CAPM were to hold, the intercept a_0 (equation (1)) should be equal to the risk-free rate of return. The coefficient of beta (a_1) is an estimate of the market risk premium, which should be positive. Unsystematic risk should not be priced (a_3 = 0), and there should be a linear relationship between return and systematic risk (a_2 = 0). In addition to examining estimates of these parameters, we examine whether the expected returns and risk premiums vary over time.

Empirical Results

Table 1 presents summary statistics for the sample companies. For the six-year period, expected returns average 16.35 percent, well above yields on government bonds. For the same period, realized returns are even higher, exceeding 20 percent on an annual basis. As a result, the time period studied is not subject to the criticism that realized returns are negative (or less than bond yields), violating most reasonable economic restrictions on a proxy for investor expectations. The high realized returns reflect the strong bull market during the period. In our sample, expected returns appear to demonstrate quite different patterns from realized returns. Although not shown in Table 1, the correlation between ex ante and ex post returns (using averages for the seventy-two-month period) for the twenty portfolios is only 0.0622 over the sample period and is insignificantly different from zero. As a result, use of expected returns may well reveal new information about the pricing of risk in markets.

The sample companies have somewhat lower systematic risk (β) than does the market generally (β = 1.0). This is due to the sample selection, which uses only dividend-paying stocks followed by analysts. Such stocks are less risky than stocks generally. Table 1 also shows that β measures are generally increased by going from an equally weighted index to a value-weighted index as a market proxy.

Table 2 reports Tinic and West's [30] results (panel A) and updates their work (1982–1987) using both realized returns (panel B) and expected returns (panel C). Panels A and B use monthly realized returns while panel C uses expected returns (annualized rates) on a monthly basis.

Realized Returns

Panel B shows that in the 1982–1987 period, systematic risk is not related to realized return: the estimate of a_1 is 0.0056, which is not significantly different from zero ($t = 0.21$). Both the intercept (0.0300) and coefficient of residual risk (−0.3228) are significant at the 0.10 level; however, there is an insignificant coefficient on beta squared.

Comparison of panels A and B shows that the 1982–1987 time period does not conform to the results for the longer period (1935–1982) studied by Tinic and West [30]. This is consistent with Tinic and West's [30] finding of significant differences among subperiods. For instance, as shown in panel A of Table 2, Tinic and West [30] find that beta is not significantly related to return in the post-1959 period.

In summary, both Tinic and West's [30] results for the last half of their study and our results (1982–1987) with realized returns provide no support for a positive link between return and systematic risk as suggested by the CAPM. The generally insignificant coefficients undoubtedly reflect the difficulties of using realized returns to test an *ex ante* model, especially for short time intervals.

Expected Returns

Use of expected returns in panel C produces quite different results. Expected returns are strongly positively related to beta: the average value of a_1 is 0.0522, which is significantly different from zero ($t = 5.78$). There is some evidence of nonlinearity given the negative value of a_2, although the coefficient is not significantly different from zero ($t = -1.44$). The significant negative value of a_3 suggests that higher unsystematic risk actually reduces expected return. We suspect that a_3 may be proxying in part for any nonlinearity in the relationship between beta and return, as discussed sub-

TABLE 2

Average Values of the Estimated Coefficients of the Four-Parameter Model

$R_{pt} = a_{0t} + a_{1t}\beta_{pt-1} + a_{2t}\beta^2_{pt-1} + a_{3t}S(e_{pt-1}) + U_{pt}$

Regressions are estimated with monthly data and based on an equally weighted market index. t-statistics are in parentheses and are estimated as the mean value for the monthly coefficient values divided by the standard error of these monthly values. An asterisk (*) indicates significance at the 0.05 level (two-tailed test).

	Number of Months	a_0	a_1	a_2	a_3
A. Tinic and West					
1. Jan 35–Dec 82	576	−0.0004	0.0134*	−0.0048	0.0807
		(−0.10)	(2.02)	(−1.52)	(1.90)
2. Jan 35–Dec 58	288	0.0004	0.0213*	−0.0078*	0.0318
		(0.09)	(2.80)	(−2.07)	(0.57)
3. Jan 59–Dec 82	288	−0.0012	0.0055	−0.0021	0.1296*
		(−0.20)	(0.50)	(−0.40)	(2.01)
4. Jan 69–Dec 82	168	0.0008	0.0026	−0.0010	0.0866
		(0.09)	(0.16)	(−0.13)	(0.97)
B. Update of Tinic and West					
Jan 82–Dec 87	72	0.0300	0.0056	0.0034	−0.3228
		(1.94)	(0.21)	(0.22)	(−1.94)
C. Estimation with Expected Returns					
Jan 82–Dec 87	72	0.1506*	0.0522*	−0.0078	−0.3593*
		(27.1)	(5.78).	(−1.44)	(−6.74)

sequently. Economically speaking, however, the effects of these last two variables appear quite small. For example, using the summary statistics in Table 1, a one standard deviation change in either beta squared or residual risk would change expected returns by less than one-third of one percent.[8] As a result, the results in panel C are roughly consistent with a two-parameter CAPM for the 1982–1987 period even though there is some evidence of nonlinearity in the data.

According to the CAPM, the intercept, a_0, in regression (1) should be equal to the risk-free rate. We calculated the difference between a_0 (estimated from expected returns) and a proxy for the risk-free rate in each of the seventy-two months. A t-statistic was then constructed as the mean difference divided by the standard error of the differences. Using both Treasury bill yields and long-term Treasury bond yields as proxies for the risk-free rate, we obtained the following results (all rates annualized):

Proxy for Risk-Free Rate	Mean Difference	t-value
Treasury bill	0.0697	16.06
Treasury bond	0.0437	10.58

The results show that a_0 is substantially above the risk-free rate. This difference may reflect at least one additional factor, not captured by beta, beta squared, or residual risk, that is priced in the market.

Value-Weighted versus Equally Weighted Market Index

Motivated by the potential impact of changes in the composition of the market portfolio, Tinic and West [30] replicate all their tests using a value-weighted CRSP index. The results do not change their conclusion that the CAPM is not well supported by the data. We also test for the importance of the market proxy as shown in panel A of Table 3.

Using historical returns, panel A shows no support for the CAPM when a value-weighted index is used, consistent with Tinic and West's [30] observation. The results for expected returns using value-weighted results make a much stronger case for nonlinearity in the risk

return tradeoff given the significant negative value of a_2. Furthermore, the reduced significance of a_3 in going to value-weighted results (at the same time a_2 changes) suggests both beta squared and residual risk may proxy for some underlying nonlinearity in the effects of beta on expected return.[9] The economic significance of beta squared is still relatively small, as a one standard deviation change in beta squared changes expected returns by approximately one percent. Our tests with expected returns thus show beta is positively related to return but that risk premiums do not increase linearly with beta as predicted by the CAPM; rather, risk premiums increase less than proportionally with increases in beta.

Individual Securities versus Portfolio Returns

While theories such as the CAPM make predictions about individual assets, empirical tests typically employ portfolios in an attempt to reduce measurement error in estimating risk. Unfortunately, such portfolio formation may mask important risk-return relationships that are relevant for individual securities. To test for the sensitivity of our results to portfolio formation, we repeated the analysis using return and risk measures for each of the approximately 400 individual stocks. Panel B of Table 3 shows the results. As was true for portfolios, the results using historical returns for individual securities provide no support for the CAPM using either an equal- or value-weighted market index. The insignificant coefficients are typical of results using monthly historical returns over short (seventy-two months) time spans.

Turning to the results for expected returns, we see that individual securities show much the same patterns as did portfolios. There is a significant positive relationship between systematic risk (beta) and expected returns, as predicted by the CAPM; however, the significant negative coefficients, a_2 and a_3, show that further predictions of the CAPM are not validated.[10]

Changes in Expected Returns and Risk Premiums

One-period models such as the CAPM make no requirement that expected returns or risk premiums are constant over time. In recent years, empirical research

TABLE 3

Average Values of the Estimated Coefficients of the Four-Parameter Model Sensitivity to Market Index and Portfolio Formation

$$R_t = a_{0t} + a_{1t}\beta_{t-1} + a_{2t}\beta^2_{t-1} + a_{3t}S(e_{t-1}) + U_t$$

Regressions are estimated with monthly data. t-statistics are in parentheses and are estimated as the mean value for the monthly coefficient values divided by the standard error of these monthly values. An asterisk (*) indicates significance at the 0.05 level (two-tailed test).

	a_0	a_1	a_2	a_3
A. Portfolio Returns (1982–1987)				
1. Historical Returns				
Equal-Weighted Index	0.0300	0.0056	0.0034	-0.3228
	(1.94)	(0.21)	(0.22)	(-1.94)
Value-Weighted Index	0.0162	0.0157	-0.0062	-0.1523
	(1.17)	(0.63)	(-0.51)	(-0.90)
2. Expected Returns				
Equal-Weighted Index	0.1506*	0.0522*	-0.0078	-0.3593*
	(27.10)	(5.78)	(-1.44)	(-6.74)
Value-Weighted Index	0.1198*	0.0788*	-0.0255*	-0.0943*
	(20.83)	(8.25)	(-5.16)	(-2.04)
B. Individual-Security Returns (1982–1987)				
1. Historical Returns				
Equal-Weighted Index	0.0196*	0.0061	-0.0041	-0.0860
	(2.48)	(0.43)	(-0.75)	(-1.27)
Value-Weighted Index	0.0144	0.0062	-0.0056	-0.0242
	(1.73)	(0.48)	(-1.24)	(0.38)
2. Expected Returns				
Equal-Weighted Index	0.1405*	0.0628*	-0.0217*	-0.1635*
	(45.78)	(33.58)	(-23.98)	(-9.83)
Value-Weighted Index	0.1392*	0.0549*	-0.0167*	-0.1445*
	(37.50)	(23.50)	(-19.30)	(-12.80)

has begun to recognize that expected returns do vary through time. There is substantial evidence that expected returns on both stocks and bonds vary based on significant autocorrelations of returns and significant coefficients when returns are regressed on various predetermined variables (see Kandel and Stambaugh [17]). Furthermore, some research has incorporated the possibility for such time variation in tests of asset pricing models (e.g., Gibbons and Ferson [14] and Ferson, Kandel, and Stambaugh [11]). To date, these approaches have generally, however, tried to infer expectations from realizations. As a result, expectations are modeled as weighted averages of past data (Conrad and Kaul [6]) or via some relatively *ad hoc* regression of realized returns on predetermined variables such as term premiums in the bond market or month of the year. In these cases, great care must be taken to ensure that the inferred expectations are not simply "fits" of data that bear little if any relationship to expectations themselves. In the subsequent discussion, we analyze changes in expected returns and risk premiums over time. By using our proxies for expected returns, rather than realized returns, we are able to provide further insights into changes in expectations over time.

Expected returns will increase with the risk-free rate unless market risk premiums decrease in an offsetting fashion. To examine these changes, we regress the seventy-two monthly sample averages of return on both short- and long-term interest rates as proxies for the risk-free rate. If the equity market risk premium were constant over time, we would expect a slope coefficient of unity and an intercept equal to the risk premium.

Table 4 shows that expected returns increase with bond yields. For the seventy-two-month period, the second regression in Table 4 shows that variations in long-term Treasury bond yields explain 38 percent of the time series variation in expected returns. The results also suggest that the market risk premium itself is not constant over time. The slope coefficient of 0.4550 is significantly less than unity (t = 7.79), suggesting that expected returns do not increase one-for-one with interest rates. For example, the 0.4550 coefficient implies that a

Table 4

Relationship of Expected Returns and Interest Rates

Entries are estimated coefficient and t-value (in parentheses). Time series regressions are estimated on the 72 monthly observations. Expected return is the mean return for the sample in that month. All yields have been annualized. Regressions were estimated using the Prais-Winsten method to correct for serial correlation. An asterisk (*) indicates significance at the 0.05 level (two-tailed test).

Dependent Variable	Intercept	Yield on Treasury Bill	Yield on Treasury Bond	R^2
1. Expected Return	0.1309* (24.97)	0.4248* (6.70)		0.39
2. Expected Return	0.1160* (14.15)		0.4550* (6.50)	0.38

1.0 percent increase in bond yields is accompanied by a 0.4550 percent increase in expected return on the equity market. This implies a 0.5450 percent (1 − 0.4550 = 0.5450) drop in the market risk premium calculated as the spread between expected returns on equities and bond yields.[11]

The results in Table 4 thus suggest that the market risk premium changes over time and that the changes are related to interest rates. Explanation of changes in expected returns requires further research incorporating variables hypothesized as being related to changes in risk premiums.

We repeated the analysis in Table 4 using realized returns rather than expected returns. In neither regression was the slope coefficient significantly different from zero at the 0.10 level and both R^2 values were less than 0.05. These weak findings demonstrate the difficulty in using changes in realized returns over any short interval to make inferences about changes in market expectations.

Summary and Conclusions

Employing direct estimates of expected returns constructed from financial analysts' forecasts, we show that systematic risk commands a significant positive risk premium, much larger than found using historical data as a proxy for expectations. We also show that there are nonlinearities in the tradeoff between expected return and systematic risk. The nonlinearities are, however, not large in terms of their economic impact on expected return. These conclusions are robust to use of different proxies for the market portfolio and use of individual company versus portfolio returns. We still find, however, that expected returns are higher than can be explained by yields on U.S. Treasury obligations plus risk premiums associated with beta and residual risk.

Our use of proxies for expected return also allow exploration of how such returns and resultant risk premiums change over time. We show that, as predicted, expected returns on equities increase with rates available in the bond market. Such increases are accompanied, however, by a reduction in the apparent difference between expected returns on equity and long-term interest rates. Explanation of such changes in risk premiums over time requires additional research.

Notes

1. Elton, Gruber, and Gultekin [9] show that stock prices react more to changes in analysts' forecasts than they do to changes in earnings themselves. Cragg and Malkiel [8] conclude "the expectations formed by Wall Street professionals get quickly and thoroughly impounded into the prices of securities" (p. 165). Givoly and Lakonishok [15] survey research on analysts' earnings forecasts. They conclude that analysts are better forecasters than time series models based on the past earnings history and that analysts' forecasts are incorporated in share prices.

2. Harris [16] provides a discussion of all three of these studies.

3. The results of such studies differ no doubt due in part to different samples and time periods. Studying samples of about fifty firms in the mid-1970s, Friend, Westerfield, and Granito [12] find the relationship between nonsystematic risk and expected return is stronger than that between beta and expected return. Focusing on the 1961–1968 period, Cragg and Malkiel [8] find just the opposite; they conclude that the relationship between beta and expected returns is stronger than that between nonsystematic risk and return. Studying approximately 400 stocks in the 1982–1985 period, Marston, Harris, and Crawford [23] find beta is significantly positively related to expected return. They find that nonsystematic risk is positively related to expected return in pairwise comparison but that this link disappears once beta is controlled for. Additionally, each of the three studies examines the role of disagreement among analysts as a proxy for risk. While research on analysts' disagreement holds promise, such disagreement appears highly collinear with the traditional measures of systematic and nonsystematic risk, thus complicating interpretation of results. Furthermore, as noted by Strock [29], measured disagreement may be contaminated by delays in reporting by analysts.

4. In concentrating on a single index model of risk (e.g., the CAPM, Sharpe [26]), we depart from the mainstream of recent work that focuses on tests of Ross's Arbitrage Pricing Theory (APT) [25], research which in part stems from dissatisfaction with empirical findings on the two-parameter CAPM. This work on APT explores pricing of multiple factors (e.g., Chen, Roll, and Ross [5]) and improvements in estimation techniques (e.g., McElroy and Burmeister [24]). Despite their contributions, empirical studies of APT to date have used realized returns.

5. While weighting schemes other than a simple average of analysts have theoretical appeal (Winkler and Makridakis [32]), some empirical evidence suggests that, at least in terms of forecast accuracy, equal weighting may be a superior choice to elaborate attempts to construct optimal weighting schemes (Ashton and Ashton [2] and Conroy and Harris [7]).

6. Firms for which the standard deviation of individual FAF exceeded twenty in any month were excluded from the analyses since we suspect some of these may involve errors in data entry. This screen resulted in excluding only a very small percentage of companies.

7. An alternative to this two-step procedure is to estimate betas and risk premiums simultaneously, which avoids the errors in variables problem associated with regressing returns on estimates in the second stage regression. Gibbons [13] suggests this approach in the context of the CAPM, and McElroy and Burmeister [24] develop the approach more fully as applied to the APT framework. We focus on the traditional two-step methodology so our work will be comparable to earlier studies. Additionally, as argued by Tinic and West ([30], pp. 141-142), the basic assumptions underlying multivariate tests (Gibbons [13], Stambaugh [27]) as applied to realized returns are the same as those behind the simpler Fama-Macbeth; furthermore, some of the finite sample properties of the multivariate tests are open to question. As applied to expected returns, we assume that beta (and other risk measures) derived from historical data are reasonable instruments for investors' perceptions of future risk. Since many investment advisory services publish betas derived from historical data, this appears a reasonable assumption, though further research in this area is needed.

8. To estimate these effects, we multiply the estimated coefficient by the standard deviations from Table 1. For beta squared and residual risk, the effects are $(-0.0078)\ (0.4243) = -0.0033$ and $(-0.3593)\ (0.0090) = -0.0032$, respectively.

9. For example, the correlation between residual risk and beta squared is 0.911. This is calculated as the simple average over seventy-two months of the correlation for the twenty portfolios in each month.

10. In addition to the results reported below, we tested for a January effect that Tinic and West [30] found in the relationship between realized return and risk. We averaged the estimated results of regression (1) using only January data and then again using the rest of the year. The data do not provide strong support for the hypothesis that the January effect reflects changes in expected returns or expected return's relationship to risk. We repeated the process for each month of the year, revealing no seasonal patterns in the parameters. Given that our proxies for expected returns assume a long holding period, it is not surprising that they do not reflect any strong seasonal pattern. Furthermore, having only six years of data makes such detection difficult.

We also tested whether the relationship between expected returns and risk variables is sensitive to the number of analysts that provide earnings forecasts. To address this issue, we segregated the sample firms into two groups in each month based on analysts' following. A "low analyst following" firm was followed by less than or equal to the mean number of analysts for the month, while a "high analyst following" firm had forecasts from a greater-than-average number of analysts. The regressions in Table 3 (for individual securities) were then estimated separately for the "low" versus "high" analyst groups. Results for each subsample were quite similar, both in terms of sign and magnitude, to those reported in Table 3.

11. The coefficients in Table 4 must be interpreted with caution since there is some evidence of model misspecification. Omission of variables related to changing risk premiums will bias the estimated slope coefficients unless such variables are uncorrelated with interest rates.

We first estimated the regressions in Table 4 using ordinary least squares (OLS), but low Durbin-Watson statistics suggested the presence of serial correlation. When the regressions were reestimated adjusting for serial correlation (using the Prais-Winsten procedure in SAS), the slope coefficients (reported in Table 4) were substantially lower than the OLS estimates. Since, in an appropriately specified model, the coefficient estimates should be robust to autocorrelation corrections, we suspect the serial correlation in residuals may itself be due to omitted variables. If such omitted variables are themselves correlated with interest rates, then the autocorrelation-adjusted estimates will be no more efficient or appropriate than OLS estimates. See Maddala [20], p. 291, and Kennedy [18], p. 79.

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Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts

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■ One of the most widely used concepts in finance is that shareholders require a risk premium over bond yields to bear the additional risks of equity investments. While models such as the two-parameter capital asset pricing model (CAPM) or arbitrage pricing theory offer explicit methods for varying risk premia across securities, the models are invariably linked to some underlying market (or factor-specific) risk premium. Unfortunately, the theoretical models provide limited practical advice on establishing empirical estimates of such a benchmark market risk premium. As a result, the typical advice to practitioners is to estimate the market risk premium based on historical realizations of share and bond returns (see Brealey and Myers [3]).

In this paper, we present estimates of shareholder required rates of return and risk premia which are derived using forward-looking analysts' growth forecasts. We update, through 1991, earlier work which, due to data availability, was restricted to the period 1982-1984 (Harris [12]). Using stronger tests, we also reexamine the efficacy of using such an expectational approach as an alternative to the use of historical averages. Using the S&P 500 as a proxy for the market portfolio, we find an average market risk premium (1982-1991) of 6.47% above yields on long-term U.S. government bonds and 5.13% above yields on corporate bonds. We also find that required returns for individual stocks vary directly with their risk (as proxied by beta) and that the market risk premium varies over time. In particular, the equity market premium over government bond yields is higher in low interest rate environments and when there is a larger spread between corporate and government bond yields. These findings show that, in addition to fitting the theoretical requirement of being forward-looking, the utilization of analysts' forecasts in estimating return requirements provides reasonable empirical results that can be useful in practical applications.

Section I provides background on the estimation of equity required returns and a brief discussion of related

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literature on financial analysts' forecasts (FAF). In Section II, models and data are discussed. Following a comparison of the results to historical risk premia, the estimates are subjected to economic tests of both their time-series and cross-sectional characteristics in Section III. Finally, conclusions are offered in Section IV.

I. Background and Literature Review

In establishing economic criteria for resource allocation, it is often convenient to use the notion of a shareholder's required rate of return. Such a rate (k) is the minimum level of expected return necessary to compensate the investor for bearing risks and receiving dollars in the future rather than in the present. In general, k will depend on returns available on alternative investments (e.g., bonds or other equities) and the riskiness of the stock. To isolate the effects of risk, it is useful to work in terms of a risk premium (rp), defined as

$$rp = k - i, \tag{1}$$

where i = required return for a zero risk investment.[1]

Lacking a superior alternative, investigators often use averages of historical realizations to estimate a benchmark "market" risk premium which then may be adjusted for the relative risk of individual stocks (e.g., using the CAPM or a variant). The historical studies of Ibbotson Associates [13] have been used frequently to implement this approach.[2] This historical approach requires the assumptions that past realizations are a good surrogate for future expectations and, as typically applied, that risk premia are constant over time. Carleton and Lakonishok [5] demonstrate empirically some of the problems with such historical premia when they are disaggregated for different time periods or groups of firms.

As an alternative to historical estimates, the current paper derives estimates of k, and hence, implied values of rp, using publicly available expectational data. This expectational approach employs the dividend growth model (hereafter referred to as the discounted cash flow or DCF model) in which a consensus measure of financial analysts' forecasts (FAF) of earnings is used as a proxy for investor expectations. Earlier works by Malkiel [17], Brigham, Vinson, and Shome [4], and Harris [12] have used FAF in DCF models, and this approach has been employed in regulatory settings (see Harris [12]) and suggested by consultants as an alternative to use of historical data (e.g., Ibbotson Associates [13, pp. 127, 128]). Unfortunately, the published studies use data extending to 1984 at the latest. Our paper draws on this earlier work but extends it through 1991.[3] Our work is closest to that done by Harris [12], who reviews literature showing a strong link between equity prices and FAF and supporting the use of FAF as a proxy for investor expectations. Using data from 1982 to 1984, Harris' results suggest that this expectational approach to estimating equity risk premia is an encouraging alternative to the use of historical averages. He also demonstrates that such risk premia vary both cross-sectionally with the riskiness of individual stocks and over time with financial market conditions.

II. Models and Data

A. Model for Estimation

The simplest and most commonly used version of the DCF model to estimate shareholders' required rate of return, k, is shown in Equation (2):

$$k = \left(\frac{D_1}{P_0}\right) + g, \tag{2}$$

where D_1 = dividend per share expected to be received at time one, P_0 = current price per share (time 0), and g = expected growth rate in dividends per share. The limitations of this model are well known, and it is straightforward to derive expressions for k based on more general specifications of the DCF model.[4] The primary difficulty in using the DCF model is obtaining an estimate of g, since it should reflect market expectations of future perfor-

[1] Theoretically, i is a risk-free rate, though empirically its proxy (e.g., yield to maturity on a government bond) is only a "least risk" alternative that is itself subject to risk. In this development, the effects of tax codes on required returns are ignored.

[2] Many leading texts in financial management use such historical risk premia to estimate a market return. See, for example, Brealey and Myers [3]. Often a market risk premium is adjusted for the observed relative risk of a stock.

[3] See Harris [12] for a discussion of the earlier work and a detailed discussion of the approach employed here.

[4] As stated, Equation (2) requires expectations of either an infinite horizon of dividend growth at a rate g or a finite horizon of dividend growth at rate g and special assumptions about the price of the stock at the end of that horizon. Essentially, the assumption must ensure that the stock price grows at a compound rate of g over the finite horizon. One could alternatively estimate a nonconstant growth model, although the proxies for multistage growth rates are even more difficult to obtain than single stage growth estimates. Marston, Harris, and Crawford [19] examine publicly available data from 1982-1985 and find that plausible measures of risk are more closely related to expected returns derived from a constant growth model than to those derived from multistage growth models. These findings illustrate empirical difficulties in finding empirical proxies for multistage growth models for large samples.

mance. Without a ready source for measuring such expectations, application of the DCF model is fraught with difficulties. This paper uses published FAF of long-run growth in earnings as a proxy for g.

B. Data

FAF for this research come from IBES (Institutional Broker's Estimate System), which is a product of Lynch, Jones, and Ryan, a major brokerage firm.[5] Representative of industry practice, IBES contains estimates of (*i*) EPS for the upcoming fiscal years (up to five separate years), and (*ii*) a five-year growth rate in EPS. Each item is available at monthly intervals.

The mean value of individual analysts' forecasts of five-year growth rate in EPS will be used as a proxy for g in the DCF model.[6] The five-year horizon is the longest horizon over which such forecasts are available from IBES and often is the longest horizon used by analysts. IBES requests "normalized" five-year growth rates from analysts in order to remove short-term distortions that might stem from using an unusually high or low earnings year as a base.

Dividend and other firm-specific information come from COMPUSTAT. Interest rates (both government and corporate) are gathered from Federal Reserve Bulletins and *Moody's Bond Record*. Exhibit 1 describes key variables used in the study. Data collected cover all dividend paying stocks in the Standard & Poor's 500 stock (S&P 500) index, plus approximately 100 additional stocks of regulated companies. Since five-year growth rates are first available from IBES beginning in 1982, the analysis covers the 113-month period from January 1982 to May 1991.

Exhibit 1. Variable Definitions

k	=	Equity required rate of return.
P_0	=	Average daily price per share.
D_1	=	Expected dividend per share measured as current indicated annual dividend from COMPUSTAT multiplied by $(1 + g)$.[a]
g	=	Average financial analysts' forecast of five-year growth rate in earnings per share (from IBES).
i_{lt}	=	Yield to maturity on long-term U.S. government obligations (source: Federal Reserve Bulletin, constant maturity series).
i_c	=	Yield to maturity on long-term corporate bonds: Moody's average.[b]
rp	=	Equity risk premium calculated as $rp = k - i$.
β	=	beta, calculated from CRSP monthly data over 60 months.

Notes:
[a]See footnote 7 for a discussion of the $(1 + g)$ adjustment.
[b]The average corporate bond yield across bond rating categories as reported by Moody's. See *Moody's Bond Survey* for a brief description and the latest published list of bonds included in the bond rating categories.

III. Risk Premia and Required Rates of Return

A. Construction of Risk Premia

For each month, a "market" required rate of return is calculated using each dividend paying stock in the S&P 500 index for which data are available. The DCF model in Equation (2) is applied to each stock and the results weighted by market value of equity to produce the market required return.[7] The return is converted to a risk premium

[5]Harris [12] provides a discussion of IBES data and its limitations. In more recent years, IBES has begun collecting forecasts for each of the next five years. Since this work was completed, the FAF used here have become available from IBES Inc., now a subsidiary of CitiBank.

[6]While the model calls for expected growth in dividends, no source of data on such projections is readily available. In addition, in the long run, dividend growth is sustainable only via growth in earnings. As long as payout ratios are not expected to change, the two growth rates will be the same.

[7]The construction of D_1 is controversial since dividends are paid quarterly and may be expected to change during the year; whereas, Equation (2), as is typical, is being applied to annual data. Both the quarterly payment of dividends (due to investors' reinvestment income before year's end, see Linke and Zumwalt [15]) and any growth during the year require an upward adjustment of the current annual rate of dividends to construct D_1. If quarterly dividends grow at a constant rate, both factors could be accommodated straightforwardly by applying Equation (2) to quarterly data with a quarterly growth rate and then annualizing the estimated quarterly required return. Unfortunately, with lumpy changes in dividends, the precise nature of the adjustment depends on both an individual company's pattern of growth during the calendar year and an individual company's required return (and hence reinvestment income in the risk class).
In this work, D_1 is calculated as $D_0 (1 + g)$. The full g adjustment is a crude approximation to adjust for both growth and reinvestment income. For example, if one expected dividends to have been raised, on average, six months ago, a "1/2 g" adjustment would allow for growth, and the remaining "1/2 g" would be justified on the basis of reinvestment income. Any precise accounting for both reinvestment income and growth would require tracking each company's dividend change history and making explicit judgments about the quarter of the next change. Since no organized "market" forecast of such a detailed nature exists, such a procedure is not possible. To get a feel for the magnitudes involved, during the sample period the dividend yield (D_1/P_0) and growth (market value weighted) for the S&P 500 were typically 4% to 6% and 11% to 13%, respectively. As a result, a "full g" adjustment on average increases the required return by 60 to 70 basis points (relative to no g adjustment).

Exhibit 2. Bond Market Yields, Equity Required Return, and Equity Risk Premium,[a] 1982-1991

	Bond Market Yields[b]		Equity Market Required Return[c]	Equity Risk Premium	
Year	(1) U.S. Gov't	(2) Moody's Corporates	(3) S&P 500	U.S. Gov't (3) - (1)	Moody's Corporates (3) - (2)
1982	12.92	14.94	20.08	7.16	5.14
1983	11.34	12.78	17.89	6.55	5.11
1984	12.48	13.49	17.26	4.78	3.77
1985	10.97	12.05	16.32	5.37	4.28
1986	7.85	9.71	15.09	7.24	5.38
1987	8.58	9.84	14.71	6.13	4.86
1988	8.96	10.18	15.37	6.41	5.19
1989	8.46	9.66	15.06	6.60	5.40
1990	8.61	9.77	15.69	7.08	5.92
1991[d]	8.21	9.41	15.61	7.40	6.20
Average[e]	9.84	11.18	16.31	6.47	5.13

Notes:
[a]Values are averages of monthly figures in percent.
[b]Yields to maturity.
[c]Required return on value weighted S&P 500 index using Equation (1).
[d]Figures for 1991 are through May.
[e]Months weighted equally.

over government bonds by subtracting i_{lt}, the yield to maturity on long-term government bonds. A risk premium over corporate bond yields is also constructed by subtracting i_C, the yield on long-term corporate bonds. Exhibit 2 reports the results by year (averages of monthly data).

The results are quite consistent with the patterns reported earlier (i.e., Harris [12]). The estimated risk premia in Exhibit 2 are positive, consistent with equity owners demanding additional rewards over and above returns on debt securities. The average expectational risk premium (1982 to 1991) over government bonds is 6.47%, only slightly higher than the 6.16% average for 1982 to 1984 reported earlier (Harris [12]). Furthermore, Exhibit 2 shows the estimated risk premia change over time, suggesting changes in the market's perception of the incremental risk of investing in equity rather than debt securities.

For comparison purposes, Exhibit 3 contains historical returns and risk premia. The average expectational risk premium reported in Exhibit 2 falls roughly midway between the arithmetic (7.5%) and geometric (5.7%) long-term differentials between returns on stocks and long-term government bonds. Note, however, that the expectational risk premia appear to change over time. In the following sections, we examine the estimated risk premia to see if they vary cross-sectionally with the risk of individual stocks and over time with financial market conditions.

B. Cross-Sectional Tests

Earlier, Harris [12] conducted crude tests of whether expectational equity risk premia varied with risk proxied by bond ratings and the dispersion of analysts' forecasts and found that required returns increased with higher risk. Here we examine the link between these premia and beta, perhaps the most commonly used measure of risk for equities.[8] In keeping with traditional work in this area, we adopt the methodology introduced by Fama and Macbeth [9] but replace realized returns with expected returns from Equation (2) as the variable to be explained. For this portion of our tests, we restrict our sample to 1982-1987

[8]For other efforts using expectational data in the context of the two-parameter CAPM, see Friend, Westerfield, and Granito [10], Cragg and Malkiel [7], Marston, Crawford, and Harris [19], Marston and Harris [20], and Linke, Kannan, Whitford, and Zumwalt [16]. For a more complete treatment of the subject, see Marston and Harris [20] from which we draw some of these results. Marston and Harris also investigate the role of unsystematic risk and the difference in estimates found when using expected versus realized returns.

Exhibit 3. Average Historical Returns on Bonds, Stocks, Bills, and Inflation in the U.S., 1926-1989

Historical Return Realizations	Geometric	Arithmetic
Common stock	10.3%	12.4%
Long-term government bonds	4.6%	4.9%
Long-term corporate bonds	5.2%	5.5%
Treasury bills	3.6%	3.7%
Inflation rate	3.1%	3.2%

Source: Ibbotson Associates, Inc., *1990 Stocks, Bonds, Bills and Inflation*, 1990 Yearbook.

and in any month include firms that have at least three forecasts of earnings growth to reduce measurement error associated with individual forecasts.[9] This restricted sample still consists of, on average, 399 firms for each of the 72 months (or 28,744 company months).

For a given company in a given month, beta is estimated via the market model (using ordinary least squares) on the prior 60 months of return data taken from CRSP. Beta estimates are updated monthly and are calculated against an equally weighted index of all NYSE securities. For each month, we aggregate firms into 20 portfolios (consisting of approximately 20 securities each). The advantage of grouped data is the reduction in potential measurement error inherent in independent variables at the company level. Portfolios are formed based on a ranking of beta estimated from a prior time period (t = -61 to t = -120). Portfolio expected returns and beta are calculated as the simple averages for the individual securities.

Using these data, we estimate the following model for each of the 72 months:

$$R_p = \alpha_0 + \alpha_1 \beta_p + u_p, \quad p = 1...20. \tag{3}$$

where:

R_p = Expected return for portfolio p in the given month,

β_p = Portfolio beta, estimated over 60 prior months, and

u_p = A random error term with mean zero.

As a result of estimating regression (3) for each month, 72 estimates of each coefficient (α_0 and α_1) are obtained. Using realized returns as the dependent variable, the traditional approach (e.g., Fama and Macbeth [9]) is to assume that realized returns are a fair game. Given this assumption, the mean of the 72 values of each coefficient is an unbiased estimate of the mean over that same time period if one could have actually used expected returns as the dependent variable. Note that if expected returns are used as the dependent variable the fair-game assumption is not required. Making the additional assumption that the true value of the coefficient is constant over the 72 months, a test of whether the mean coefficient is different from zero is performed using a t-statistic where the denominator is the standard error of the 72 values of the coefficient. This is the technique employed by Fama and Macbeth [9]. If one assumes the CAPM is correct, the coefficient α_1 is an empirical estimate of the market risk premium, which should be positive.

To test the sensitivity of the results, we also repeat our procedures using individual security returns rather than portfolios. To account, at least in part, for differences in precision of coefficient estimates in different months we also report results in which monthly parameter estimates are weighted inversely by the standard error of the coefficient estimate rather than being weighted equally (following Chan, Hamao, and Lakonishok [6]).

Exhibit 4 shows that there is a significant positive link between expectational required returns and beta. For instance, in Panel A, the mean coefficient of 2.78 on beta is significantly different from zero at better than the 0.001 level (t = 35.31), and each of the 72 monthly coefficients going into this average is positive (as shown by that 100% positive figure). Using individual stock returns, the significant positive link between beta and expected return remains, though it is smaller in magnitude than for portfolios.[10] Comparison of Panels A and B shows that the results are not sensitive to the weighting of monthly coefficients.

While the findings in Exhibit 4 suggest a strong positive link between beta and risk premia (a result often not supported when realized returns are used as a proxy for expectations; e.g., see Tinic and West [22]), the results do not support the predictions of a simple CAPM. In particular, the intercept is higher than a proxy for the risk-free rate over the sample period and the coefficient of beta is well below estimates of a market risk premium obtained from either expectational (Exhibit 2) or historical data (Exhibit

[9]Firms for which the standard deviation of individual FAF exceeded 20 in any month were excluded since we suspect some of these involve errors in data entry. This screen eliminated very few companies in any month. The 1982-1987 period was chosen due to the availability of data on betas.

[10]The smaller coefficients on beta using individual stock portfolio returns are likely due in part to the higher measurement error in measuring individual stock versus portfolio betas.

Exhibit 4. Mean Values of Monthly Parameter Estimates for the Relationship Between Required Returns and Beta for Both Portfolios and Individual Securities (Figures in Parentheses are *t* Values and Percent Positive), 1982-1987

	Intercept	B	Adjusted $R^{2\,c}$	F[c]
Panel A. Equal Weighting[a]				
Portfolio returns	14.06 (54.02, 100)	2.78 (35.31, 100)	0.503	25.4
Security returns	14.77 (58.10, 100)	1.91 (16.50, 99)	0.080	39.0
Panel B. Weighted by Standard Errors[b]				
Portfolio returns	13.86 (215.6, 100)	2.67 (35.80, 100)	0.503	25.4
Security returns	14.63 (398.9, 100)	1.92 (47.3, 99)	0.080	39.0

[a]Equally weighted average of monthly parameters estimated using cross-sectional data for each of the 72 months, January 1982 - December 1987.
[b]In obtaining the reported means, estimates of the monthly intercept and slope coefficients are weighted inversely by the standard error of the estimate from the cross-sectional regression for that month.
[c]Values are averages for the 72 monthly regressions.

3).[11] Nonetheless, the results show that the estimated risk premia conform to the general theoretical relationship between risk and required return that is expected when investors are risk-averse.

C. Time Series Tests — Changes in Market Risk Premia

A potential benefit of using ex ante risk premia is the estimation of changes in market risk premia over time. With changes in the economy and financial markets, equity investments may be perceived to change in risk. For instance, investor sentiment about future business conditions likely affects attitudes about the riskiness of equity investments compared to investments in the bond markets. Moreover, since bonds are risky investments themselves, equity risk premia (relative to bonds) could change due to changes in perceived riskiness of bonds, even if equities displayed no shifts in risk. For example, during the high interest rate period of the early 1980s, the high level of interest rate volatility made fixed income investments more risky holdings than they were in a world of relatively stable rates.

Studying changes in risk premia for utility stocks, Brigham, et al [4] conclude that, prior to 1980, utility risk premia increased with the level of interest rates, but that this pattern reversed thereafter, resulting in an inverse correlation between risk premia and interest rates. Studying risk premia for both utilities and the equity market generally, Harris [12] also reports that risk premia appear to change over time. Specifically, he finds that equity risk premia decreased with the level of government interest rates, increased with the increases in the spread between corporate and government bond yields, and increased with increases in the dispersion of analysts' forecasts. Harris' study is, however, restricted to the 36-month period, 1982 to 1984.

Exhibit 5 reports results of analyzing the relationship between equity risk premia, interest rates, and yield spreads between corporate and government bonds. Following Harris [12], these bond yield spreads are used as a time series proxy for equity risk. As the perceived riskiness of corporate activity increases, the difference between yields on corporate bonds and government bonds should increase. One would expect the sources of increased riskiness to corporate bonds to also increase risks to shareholders. All regressions in Exhibit 5 are corrected for serial correlation.[12]

[11]Estimation difficulties confound precise interpretation of the intercept as the risk-free rate and the coefficient on beta as the market risk premium (see Miller and Scholes [21], and Black, Jensen, and Scholes [2]). The higher than expected intercept and lower than expected slope coefficient on beta are consistent with the prior studies of Black, Jensen, and Scholes [2], and Fama and MacBeth [9] using historical returns. Such results are consistent with Black's [1] zero beta model, although alternative explanations for these findings exist as well (as noted by Black, Jensen, and Scholes [2]).

[12]Ordinary least squares regressions showed severe positive autocorrelation in many cases, with Durbin Watson statistics typically below one. Estimation used the Prais-Winsten method. See Johnston [14, pp. 321-325].

Exhibit 5. Changes in Equity Risk Premia Over Time — Entries are Coefficient (*t*-value); Dependent Variable is Equity Risk Premium

Time period	Intercept	i_{lt}	$i_c - i_{lt}$	R^2
A. May 1991-19~~9~~2	0.131	-0.651		0.53
	(19.82)	(-11.16)		
8	0.092	-0.363	0.666	0.54
	(14.26)	(-6.74)	(5.48)	
B. 1982-1984	0.140	-0.637		0.43
	(8.15)	(-5.00)		
	0.064	-0.203	1.549	0.60
	(3.25)	(-1.63)	(4.84)	
C. 1985-1987	0.131	-0.739		0.74
	(7.73)	(-9.67)		
	0.110	-0.561	0.317	0.77
	(12.53)	(-7.30)	(1.87)	
D. 1988-1991	0.136	-0.793		0.68
	(16.23)	(-8.29)		
	0.130	-0.738	0.098	0.68
	(8.71)	(-4.96)	(0.40)	

Note: All variables are defined in Exhibit 1. Regressions were estimated using monthly data and were corrected for serial correlation using the Prais-Winsten method. For purposes of this regression, variables are expressed in decimal form, e.g., 14% = 0.14.

For the entire sample period, Panel A shows that risk premia are negatively related to the level of interest rates — as proxied by yields on government bonds, i_{lt}. This negative relationship is also true for each of the subperiods displayed in Panels B through D. Such a negative relationship may result from increases in the perceived riskiness of investment in government debt at high levels of interest rates. A direct measure of uncertainty about investments in government bonds would be necessary to test this hypothesis directly.

For the entire 1982 to 1991 period, the addition of the yield spread risk proxy to the regressions dramatically lowers the magnitude of the coefficient on government bond yields, as can be seen by comparing Equations 1 and 2 of Panel A. Furthermore, the coefficient of the yield spread (0.666) is itself significantly positive. This pattern suggests that a reduction in the risk differential between investment in government bonds and in corporate activity is translated into a lower equity market risk premium. Further examination of Panels B through D, however, suggests that the yield spread variable is much more important in explaining changes in equity risk premia in the early portion of the 1980s than in the 1988 to 1991 period.

In summary, market equity risk premia change over time and appear inversely related to the level of government interest rates but positively related to the bond yield spread, which proxies for the incremental risk of investing in equities as opposed to government bonds.

IV. Conclusions

Shareholder required rates of return and risk premia are based on theories about investors' expectations for the future. In practice, however, risk premia are often estimated using averages of historical returns. This paper applies an alternate approach to estimating risk premia that employs publicly available expectational data. At least for the decade studied (1982 to 1991), the resultant average market equity risk premium over government bonds is comparable in magnitude to long-term differences (1926 to 1989) in historical returns between stocks and bonds. There is strong evidence, however, that market risk premia change over time and, as a result, use of a constant historical average risk premium is not likely to mirror changes in investor return requirements. The results also show that the expectational risk premia vary cross-sectionally with the relative risk (beta) of individual stocks.

The approach offers a straightforward and powerful aid in establishing required rates of return either for corporate investment decisions or in the regulatory arena. Since data are readily available on a wide range of equities, an investigator can analyze various proxy groups (e.g., portfolios of utility stocks) appropriate for a particular decision as well as analyze changes in equity return requirements over time.

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Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return

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I. Introduction

Shareholder required rates of return play key roles in establishing economic criteria for resource allocation in many corporate and regulatory decisions. Theory dictates that such returns should be forward-looking return requirements that take into account the risk of the specific equity investment.

Estimation of such returns, however, presents numerous and difficult problems. Although theory clearly calls for a forward-looking required return, investigators, lacking a superior alternative, often resort to averages of historical realizations. One primary example is the determination of equity required return as a "least risk" rate plus a risk premium where an equity risk premium is calculated as an average of past differences between equity returns and returns on debt instruments. The historical studies of Ibbotson *et al.* [9] have been used frequently to implement this approach.[1] Use of such historical risk premia assumes that past realizations are a good surrogate for future expectations and that risk premia are roughly constant over time. Additionally, the choice of a time period over which to average data under such a procedure is essentially arbitrary. Carleton and Lakonishok [3] demonstrate empirically some of the problems with such historical premia when they are disaggregated for different time periods or groups of firms.

Recently Brigham, Shome, and Vinson [2] surveyed work on developing *ex ante* equity risk premia with particular emphasis on regulated utilities. They presented their own risk premia estimates, which make use of financial analysts' forecasts as surrogates for investor expectations.

The current paper follows an approach similar to Brigham *et al.* and derives equity required returns and risk premia using publicly available expectational

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[1]Many leading texts in financial management use such historical risk premia to estimate a market return. See for example, Brealey and Myers [1]. Often a market risk premium is adjusted for the observed relative risk of a stock.

data. The estimation makes use of dividend growth models but incorporates expected rather than historical growth rates. A consensus forecast of financial analysts is used as a proxy for investor expectations. While Brigham *et al.* focus on utility securities, this paper also provides estimates of risk premia for a broad market index. Equity risk premia for both the market and for utilities are shown to vary over time with changes in the perceived riskiness of corporate activity relative to U.S. government bonds. In addition, the estimated risk premia at any given time are shown to vary across groups of stocks. The paper also provides results using the dispersion of analysts' forecasts as an *ex ante* proxy for equity risk.

Section II discusses related literature on financial analysts' forecasts (FAF) and the estimation of required returns using such forecasts. In Section III models and data are discussed. Following a comparison of the results to those of earlier studies (including historical risk premia), the estimates are subjected to economic tests of both their time-series and their cross-sectional characteristics in Section V. Finally, conclusions are offered.

II. Background and Literature Review

In finance, it is often convenient to use the notion of a shareholder's required rate of return. Such a rate (k) is the minimum level of expected return necessary to compensate the investor for bearing risks and receiving dollars in the future rather than in the present. In general, k will depend on returns available on alternative investments (*e.g.*, bonds or other equities) and the riskiness of the stock. To isolate the effects of risk it is often useful (both theoretically and empirically) to work in terms of a risk premium (rp), defined as

$$rp = k - i, \qquad (1)$$

where i = required return for a zero risk investment. Theoretically, i is a risk free rate, though empirically its proxy (*e.g.*, yield to maturity on a government bond) is only a "least risk" alternative that is itself subject to risk.[2] While models such as the capital asset pricing model offer explicit methods for varying risk premia across securities, they provide little practical advice on establishing some benchmark market risk premium. Other models, such as the dividend growth model (hereafter referred to as the discounted cash flow, or DCF, model), can be used to provide direct estimates of k, and hence implied values of rp, but are silent on how rp ought to vary across firms. In this paper DCF models are used to establish risk premia both for the market and for utility stocks. Since the DCF analysis uses a consensus measure of FAF of earnings as a proxy for investor expectations, a brief review of research on FAF is appropriate.

A. Literature on FAF

Much of the burgeoning literature on properties of FAF is surveyed by Givoly and Lakonishok [8]. Of primary importance for this work is the relationship between FAF and investor expectations that determine stock prices. Such forecast data are readily available. That they are used by investors is evidenced by the commercial viability of services that provide such forecasts and by the results of studies of investors' behavior (Touche, Ross and Company [16], Stanley, Lewellen and Schlarbaum [15]). Moreover, a growing body of knowledge shows that analysts' earnings forecasts are indeed reflected in stock prices. Such studies typically employ a consensus measure of FAF calculated as a simple average[3] of forecasts by individual analysts. Elton, Gruber, and Gultekin [5] show that stock prices react more to changes in analysts' forecasts of earnings than they do to changes in earnings themselves, suggesting the usefulness of FAF as a surrogate for market expectations. In an extensive NBER study using analysts' earnings forecasts, Cragg and Malkiel [4, p. 165] conclude "the expectations formed by Wall Street professionals get quickly and thoroughly impounded into the prices of securities. Implicitly, we have found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based." Updating Cragg and Malkiel's work, Vander Weide and Carleton [17] recently compare consensus FAF of earnings growth to 41 different historical growth measures.[4] They con-

[2]In this development the effects of tax codes and inflation on required returns are ignored.

[3]Mayshar [14] discusses the problems of explaining equilibrium prices of securities when there is divergence of opinion among investors. One issue is whether it is the expectation of the marginal investor or the average investor that determines security prices. Mayshar shows that, in general given divergence of opinion and trading costs, not all investors trade in all assets and that equilibrium prices and the identity of investors trading in each asset are jointly determined. In this sense, equilibrium prices can be considered as "determined simultaneously by the average and marginal investors."

[4]Both Cragg and Malkiel [4] and Vander Weide and Carleton [17] show that an average measure of analysts' forecasts of growth in earnings is powerful in explaining cross-sectional variation in price earnings ratios of stocks.

clude that "there is overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically-oriented growth measures in predicting the firm's stock price . . . consistent with the hypothesis that investors use analysts' forecasts, rather than historically-oriented growth calculations, in making stock buy and sell decisions." [17, p. 15].

B. Use of FAF to Estimate Equity Required Returns

Given the demonstrated relationship of FAF to equity prices and the direct theoretical appeal of expectational data, it is no surprise that FAF have been used in conjunction with DCF models to estimate equity return requirements. Typically such approaches have estimated an *ex ante* risk premium (rp) calculated as the difference between required return and a least risk rate as shown in Equation (1).

Malkiel [13] estimated such risk premia for the Dow Jones Industrial Index using a nonconstant growth version of the DCF model. Initial years of growth were based on Value Line's five-year earnings growth forecasts with subsequent growth approaching a long-run real national growth rate of 4%. More recently, Brigham, Vinson, and Shome [2] used a two stage DCF growth model to estimate *ex ante* risk premia for electric utilities and the Dow Jones Industrial Index. For the period 1966–1984, they report annual risk premia for both Dow Jones Industrial and Electric Indices using Value Line's forecasts. Beginning in 1980 they report monthly risk premia for electric utilities with the source of FAF varying over time: starting with Value Line, adding Merrill Lynch and Salomon Brothers in 1981 and finally, in mid-1983, adding IBES data. IBES (Institutional Broker's Estimate System) is a collection of analysts' forecasts and is discussed in the next section. The resultant risk premia vary over time. In addition, Brigham *et al.* present evidence that their estimated risk premia vary cross-sectionally with a stock's risk (as proxied by bond rating) and over time with the level of interest rates. FAF also have been used in conjunction with DCF models by a number of expert witnesses in rate of return determination for regulated utilities. Recently, the Federal Communications Commission [6] tentatively endorsed the use of consensus FAF in DCF determinations of required return on equity.[5]

This paper adds to earlier work in a number of important respects. First, while Malkiel and Brigham *et al.* focus on electric utilities or the Dow Jones Industrial Index, this paper estimates risk premia for a broadly defined market index — the Standard and Poor's 500. Thus, the results are directly comparable to historical "market" risk premia typically estimated on a similar sample of stocks. Second, the study uses a large sample of FAF (beginning in 1982 when the necessary data first became available). This provides the ability to use a consensus measure of expectations as would be suggested by financial theory. Third, the results show that the derived risk premia change over time and that these changes are related to proxies for risk, which would be expected to be associated with equity risk premia. Although such changes have been noted by earlier studies (*e.g.*, Brigham *et al.*), there is little work explaining the patterns of change. Finally, the paper shows the usefulness of the dispersion of FAF as a proxy for risk. Such a measure is a direct expectational measure of risk and does not rely on assumptions of risk stability over time as do most operational methods of deriving risk surrogates.

III. Models and Data

A. Model for Estimation

The DCF model states that the current market price is the present value of expected future cash flows from ownership. The simplest and most commonly used version estimates shareholders' required rate of return, k, as the sum of dividend yield and expected growth in dividends, or

$$k = (D_1/P_0) + g. \qquad (2)$$

where D_1 = dividend per share expected to be received at time one, P_0 = current price per share (time 0), and g = expected growth rate in dividends per share. The limitations of this model are well known, and it is straightforward to derive expressions for k based on more general specifications of the DCF model.[6] The primary difficulty in using the DCF model is obtaining an estimate of g, since it should reflect market expecta-

[5]In response to the FCC's *Notice of Proposed Rulemaking* [6] to determine authorized rates of return, AT&T used an approach driven by FAF growth estimates from IBES. Also see, for example, W.T. Carleton, *Testimony before the Vermont Public Service Board*, Docket No. 4865 (January 1984) and R.S. Harris, *Testimony filed with the Delaware Public Service Commission*, Docket 84–33 (November 1984). In its *Supplemental Notice* [6], the FCC tentatively endorsed substantial reliance on FAF for use in DCF determination of cost of equity.

[6]As stated, Equation (2) requires expectations of either an infinite horizon of dividend growth at rate g or a finite horizon of dividend growth at rate g and special assumptions about the price of the stock at the end of that horizon. Essentially, the assumption must ensure that the stock price grows at a compound rate of g over the finite horizon.

tions of future performance. Without a ready source for measuring such expectations, application of the DCF model is fraught with difficulties even if the simple version shown in Equation (2) fits the equity investment in question. This paper uses published FAF of long-run growth in earnings as a proxy for g.

B. Data

Many analysts publish forecasts of corporate earnings. Such forecasts are widely disseminated and are the subject of considerable interest both to investors and researchers (see Givoly and Lakonishok [8]). In recent years, this interest has led to a viable market for services that collect and disseminate such FAF. FAF for this research come from IBES (Institutional Broker's Estimate System), which is a product of Lynch, Jones, and Ryan, a major brokerage firm. Data in IBES represent a compilation of earnings per share (EPS) estimates of about 2000 individual analysts from 100 brokerage firms on over 2000 corporations. IBES data are provided to clients in a number of forms, including on-line data bases provided by vendors. The client base, which currently numbers more than 300, includes most large institutional investors such as pension funds, banks, and insurance companies. Representative of industry practice, IBES contains estimates of (i) EPS for the upcoming fiscal year, (ii) EPS for the subsequent year, and (iii) a projected five-year growth rate in EPS. Each item is available at monthly intervals.

IBES collection procedures are designed to obtain timely forecasts made on a consistent basis. IBES requests "normalized" five-year growth rates from analysts. Such normalization is designed to remove short-term distortions that might stem from using an unusually high or low earnings year as a base. These growth and other earnings forecasts are updated when analysts formally change their stated predictions. IBES does, however, verify prior forecasts monthly to make sure that analysts still hold to them. Despite these procedures, there remain potential difficulties in using IBES data to the extent that some analysts fail to normalize growth projections or fail to continually review and revise their earnings estimates. To control for some of these potential difficulties, this analysis uses averages of analysts' forecasts for a wide range of companies over an extended number of months.

In this research, the mean value of individual analyst's forecasts of five-year growth rate in EPS will be used as a proxy for g in the DCF model.[7] The five-year horizon is the longest horizon over which such forecasts are available from IBES and often is the longest horizon used by analysts. One could make alternate assumptions about growth after five years and use a more general version of a DCF model, but unfortunately, there is no source for obtaining market estimates of this expected growth. As a result, the current analysis applies the five-year growth rate as a proxy for g in Equation (2). Given no objective basis for predicting a change in growth (see Footnote 6), this avoids the introduction of *ad hoc* assumptions about future growth. Importantly, however, the approach is applied to portfolios of stocks rather than to individual securities, since future growth patterns may be expected to have drastic changes for some specific securities. Stock prices were obtained from Chase Econometrics and dividend and other firm-specific information from COMPUSTAT. Interest rates (both government and corporate) were gathered from Federal Reserve Bulletins and from Moody's Bond Record. Exhibit 1 describes key variables used in the study. Data collected cover all dividend paying stocks in the Standard and Poor's 500 stock (SP500) index plus approximately

Exhibit 1. Variable Definitions

k	=	equity required rate of return
P_0	=	average daily price per share*
D_1	=	expected dividend per share measured as current indicated annual dividend from COMPUSTAT multiplied by $(1+g)^{\dagger}$
g	=	average financial analysts' forecasts of five-year growth rate in earnings per share (from IBES)
σ_g	=	cross-sectional standard deviation of analysts' forecasts of growth in earnings per share (from IBES)
N_g	=	number of analysts' forecasts of g (from IBES)
i_{20}	=	yield to maturity on 20-year U.S. government obligations. Source: Federal Reserve Bulletin, constant maturity series
i_c	=	yield to maturity on long-term corporate bonds: Moody's average
i_u	=	yield to maturity on long-term public utility bonds: Moody's average
rp	=	equity risk premium calculated as $rp = k - i_{20}$

*In results reported P_0 is the average daily price for a stock from the beginning of the month up to and including the date of publication of monthly IBES data (typically half a month). Almost identical results were found using the average price for the entire month.

†See Footnote 8 at the end of the paper for a discussion of the $(1+g)$ adjustment.

[7]While the model calls for expected growth in dividends, no source of data on such projections is readily available. In addition, in the long run, dividend growth is sustainable only via growth in earnings. As long as payout ratios are not expected to change, the two growth rates will be the same. Vander Weide and Carleton [17] also use the IBES growth rate in earnings per share.

150 additional stocks of regulated companies. Since five-year growth rates were first available from IBES in January 1982, the analysis covers the 36-month period 1982–1984. On average, each company in SP500 had approximately nine individual forecasts of g per month, with some companies having 20 or more forecasts of g. As a result, well over 100,000 FAF (company-months) were employed in the analysis.

IV. Construction of Risk Premia and Required Rates of Return

For each month, a "market" required rate of return was calculated using each dividend paying stock in the SP500 index for which data were available. The DCF model in Equation (2) was applied to each stock and the results weighted by market value of equity to produce the market required return.[8] The return was converted to a risk premium by subtracting i_{20}, the yield to maturity on 20-year U.S. government bonds.[9] The procedure was repeated for the Standard and Poor's Utility Index (SPUT) of 40 stocks. Exhibit 2 reports the results by quarter.

Exhibit 2. Required Rates of Return and Risk Premia

		SP500		SPUT	
	Bond Yield*	Required† Return	Risk‡ Premium	Required† Return	Risk‡ Premium
1982					
Quarter 1	14.27	20.81	6.54	18.83	4.56
Quarter 2	13.74	20.68	6.94	18.51	4.77
Quarter 3	12.94	20.23	7.29	18.55	5.61
Quarter 4	10.72	18.58	7.86	17.20	6.48
Average	12.92	20.08	7.16	18.28	5.36
1983					
Quarter 1	10.87	18.07	7.20	16.71	5.84
Quarter 2	10.80	17.76	6.96	16.52	5.72
Quarter 3	11.79	17.90	6.11	16.39	4.60
Quarter 4	11.90	17.81	5.91	16.00	4.10
Average	11.34	17.88	6.54	16.41	5.07
1984					
Quarter 1	12.09	17.22	5.13	16.48	4.39
Quarter 2	13.21	17.42	4.21	16.99	3.78
Quarter 3	12.83	17.34	4.51	16.62	3.79
Quarter 4	11.78	17.05	5.27	15.18	4.04
Average	12.48	17.26	4.78	16.48	4.00
Average 1982–1984	12.25	18.41	6.16	17.06	4.81

*i_{20} = Yield on U.S. Treasury obligation, 20 year constant maturity.
†Monthly required return (k) calculated as value weighted average. Quarterly values are simple averages of monthly figures.
‡Risk premium calculated as k − i_{20}.

The results appear quite plausible. The estimated risk premia are positive, consistent with equity owners demanding a risk premium over and above returns available on debt securities. Also, as would be expected for less risky stocks, the utility risk premia consistently fall below those estimated for stocks in general. Exhibit 2 shows that estimated risk premia change over time, suggesting changes in the market's perception of the incremental risk of investing in equity rather than debt securities. Such changes will be examined in a subsequent section.

For comparative purposes, Exhibit 3 provides results of related studies. The long-run differential return between stocks and long-term government bonds (Panel A) has been about 6.4% per year (on a geometric basis). It is comforting to note that this is very close to the 6.16% average annual risk premia estimated in Exhibit 2. Note, however, that such risk premia appear to change over time. Panels B and C show some of Brigham *et al.*'s risk premium estimates. Unfortunate-

[8] The construction of D_1 is controversial since dividends are paid quarterly and may be expected to change during the year; whereas, Equation (2), as is typical, is being applied to annual data. Both the quarterly payment of dividends (due to investors' reinvestment income before year's end, see Linke, and Zumwalt [11]) and any growth during the year require an upward adjustment of the current annual rate of dividends to construct D_1. If quarterly dividends grew at a constant rate, both factors could be accommodated straightforwardly by applying Equation (2) to quarterly data (with a quarterly growth rate) and then annualizing the estimated quarterly required return. Unfortunately, with lumpy changes in dividends, the precise nature of the adjustment depends, on both an individual company's pattern of growth during the calendar year and an individual company's required return (and hence reinvestment income in that risk class).

In this work, D_1 is calculated as $D_0(1 + g)$. The full g adjustment is a crude approximation to adjust for both growth and reinvestment income. For example, if one expected dividends to have been raised, on average, six months ago, a "½ g" adjustment would allow for growth, the remaining "½ g" would be justified on the basis of reinvestment income. Any precise accounting for both reinvestment income and growth would require tracking each company's dividend change history and making explicit judgments about the quarter of the next change. Since no organized "market" forecasts of such a detailed nature exist, such a procedure is not possible. To get a feel for the magnitudes involved, the average dividend yield (D_1/P_0) and growth (market value weighted 1982–1984) for the SP500 were 5.8% and 12.5%. Comparable figures for the SP utility index were 10.4% and 6.7%. As a result, a "full g" adjustment on average increases the required return by 60–70 basis points (relative to no g adjustment) for both indices.

[9] Brigham, Shome, and Vinson [2] also use this interest rate to create equity risk premia. The results were robust to changes in weighting. For the SP500, equal weighting (rather than value weighting) increased the 1982–1984 risk premium by two basis points while for the SPUT equal weighting resulted in a 21 basis point increase. As a further test, the SP500 stocks were ranked on g and the upper and lower deciles deleted. The resulting risk premium (1982–84 average) was 5.94%. A similar procedure used to rank dividend yield produced an SP500 risk premium of 6.18%.

Exhibit 3. Results of Related Studies: Historical Returns and Estimated Risk Premia

	Geometric	Arithmetic
A. Historical Return Realizations (1926–1980)*		
Common Stocks	9.4%	11.7%
Long-Term Government Bonds	3.0%	3.1%
U.S. Treasury Bills	2.8%	2.8%

	Dow Jones Industrials		Dow Jones Electrics	
	Average	Range	Average	Range
B. DCF risk premia using one analyst†				
1966–1970	5.45	4.97–6.81	3.91	3.46–4.13
1971–1975	5.51	4.95–6.92	5.95	4.52–8.72
1976–1980	6.23	5.09–6.88	5.82	5.55–6.21
1981	5.38		5.62	
1982	5.30		3.70	
1983	5.87		5.64	
1984	3.75		4.06	
Average 1982–1984	4.97		4.47	

	Electric Utilities
C. DCF risk premia using three analysts‡	
1981	3.73
1982	4.52
1983	5.17
1984 (through June)	5.01

*Ibbotson, Sinquefield, and Siegel [9].
†Analyst is Value Line. Data are annual estimates using two-stage growth DCF model. Source: Brigham, Shome, and Vinson [2].
‡Analysts are Value Line, Merrill Lynch and Salomon Brothers. Data are averages of monthly values from Brigham, Shome, and Vinson [2].

ly, their work does not include a broad market index directly comparable to the SP500. Rather, they use the Dow Jones Industrial Index based on 30 large industrial concerns. Though the SPUT includes a broader set of utilities than the electrics covered by Brigham *et al.*, their average risk premium estimates are also in the 4 to 5% range for the early 1980s.

While the estimates in Exhibit 2 are quite plausible, the question still remains as to whether they satisfy economic criteria one would expect of risk premia. In the following section, the estimated risk premia are subjected to a series of tests to see if they vary both cross-sectionally and over time with changes in risk. The tests are ultimately joint tests of the estimates as useful risk premia, the measured proxies for risk and the validity of the economic hypothesis. Nonetheless, if the tests using the risk premia have results conforming to theoretical expectation, the comfort level in using them is increased accordingly.

Exhibit 4. Risk Premia by Moody's Bond Ratings*

	Electric Utilities: SIC's 4911 and 4931			
	Aaa	Aa	A	Baa
Risk Premia				
Risk Premium (Expectational g)	3.60	4.33	4.81	4.90
Risk Premium (Historical g†)	6.10	3.28	3.09	5.24
Financial Data				
Debt Ratio‡	0.46	0.48	0.50	0.51
Beta§	0.58	0.61	0.62	0.61
Variability¶				
Operating Cash Flow	0.009	0.016	0.022	0.059
Equity Cash Flow	0.006	0.013	0.019	0.024
Standard Deviation** of Analysts' Forecasts	1.00	1.26	1.33	1.79

*Moody's ratings as of January 1984 from *Moody's Bond Record*, February 1984. The number of companies by rating is Aaa (2), Aa (22), A (32), Baa (22). Risk premia are averages of monthly values, January 1982–September 1983.
†Historical Growth is past five-year earnings growth, based on 20 quarters of past data. Source: IBES.
‡Debt Ratio = Long-Term Debt ÷ Total Capital, average 1978–1982 from COMPUSTAT.
§Beta from *Value Line*, January 29, 1982.
¶Measure of variability around trend growth: variance of residuals of regressions on quarterly COMPUSTAT data (1978–1982). Regressions are log of variable regressed on time and seasonal dummies.
**This is the average value of the standard deviation around the mean long-term growth forecast. Such standard deviations are reported for each company in each month. Note it is *not* the cross-sectional standard deviation of growth rates among companies.

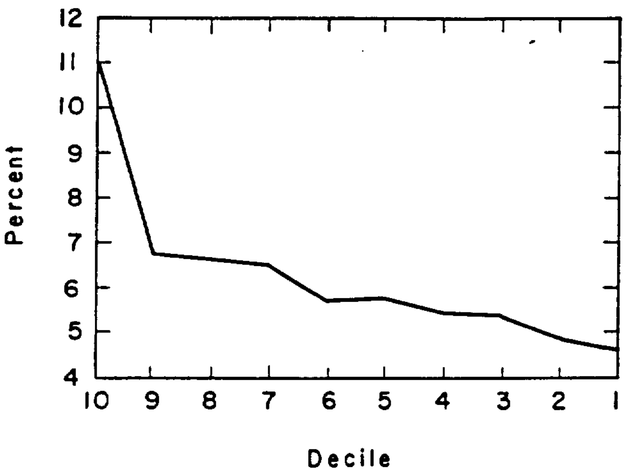
V. Characteristics of Risk Premia

A. Cross-Sectional Tests

Brigham *et al.* show that risk premia (IBES estimates for first half of 1984) for electric utilities are lower the higher the bond rating of the company, confirming the expected tradeoff between risk and return. A similar experiment for electrics, using the current data stretching back to January 1982, confirmed this relationship for a longer time period. Exhibit 4 reports selected results of that analysis. As a contrast, Exhibit 4 also shows the results of using historical growth rates (rather than FAF) in a DCF model. Risk premia derived from historical growth are actually higher for companies with very safe debt, suggesting the clear inferiority of historical to expectational growth rates. With the exception of beta, which is roughly constant across groups, other measures of risk noted in Exhibit 4 confirm the risk differentials associated with bond rating groups.

A further test of the cross-sectional variation in risk premia was performed by dividing the universe of

Exhibit 5. Equity Risk Premia: Deciles Based on Standard Deviation of Financial Analysts Forecasts* (Companies with at least three analysts)



*Risk premia were calculated as equally weighted averages for each decile (10 = highest dispersion) for each of three months: January 1982, December 1982, and September 1983 (approximately 50 companies per decile). These premia were then averaged across deciles. A similar downward pattern was evident in each month.

stocks (industrial plus utility) according to the dispersion of analysts' forecasts, σ_g. This cross-sectional measure of analysts' disagreement should be positively related to the uncertainty of future growth prospects and hence to the riskiness of equity investment. Elsewhere, Malkiel [12] has discussed the rationale and usefulness of such dispersion as an *ex ante* measure of risk. Malkiel argues that σ_g may be a proxy for systematic risk and shows that it bears a closer empirical relationship to expected return than does beta or other risk measures. Most of Malkiel's work is, however, based on data from the 1960s. Exhibit 5 reports risk premia by decile based on σ_g for companies having at least three analysts' forecasts. The three months were chosen as representative. The results show a consistent positive relationship between risk premia and dispersion of analysts' forecasts.

The results in Exhibits 4 and 5 show that the estimated risk premia conform to theoretical relationships between risk and required return that are expected when investors are risk averse. This strengthens the case for using such risk premia, and provides encouragement for further study of their structure.[10]

B. Time Series Tests

A potential benefit of using *ex ante* risk premia is the estimation of changes in risk premia over time. Brigham *et al.* [2] note such changes for utility stocks and relate them to changes in interest rates. They conclude that prior to 1980 utility risk premia increased with the level of interest rates, but that this pattern reversed thereafter, resulting in an inverse correlation between risk premia and interest rates. They explain this turnaround as the outcome of changes in bond markets and adaptation of utilities and their regulators to an inflationary environment. Brigham *et al.* do not, however, analyze changing risk premia for stocks in general. Furthermore, they do not provide direct empirical proxies for changes in equity risks that would explain changes in equity risk premia over time.[11]

C. Changes in Risk Premia

One would expect changes in measured equity risk premia to be related to changes in perceived riskiness. First, with changes in the economy and financial markets, equity investments may be perceived to change in risk. Second, since government bonds are risky investments themselves, their perceived riskiness may change. For example, the large increase in interest rate volatility in the last decade has undoubtedly made fixed income investments more risky holdings than they were in a world of relatively stable rates. Measured equity risk premia (relative to government bonds) could thus be reduced due to increases in perceived riskiness of bonds, even if equities displayed no shifts in risk.

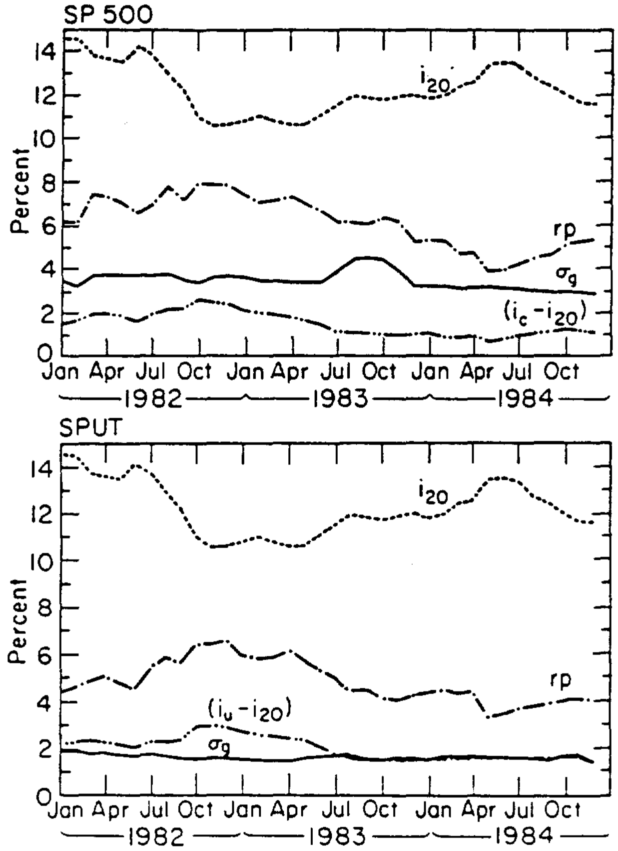
One measure of risk, the standard deviation of FAF, σ_g, was shown previously to be related to cross-sectional differences in risk premia. To test its usefulness as a time series measure of risk, the average value of σ_g was calculated each month for the SP500 index and the SPUT index. The results are graphed in Exhibit 6.[12]

[10]Such *ex ante* required returns offer a useful alternative to *ex post* data typically used in tests of asset pricing models. See Friend, Westerfield, and Granito [7] for a test of the CAPM using survey data rather than *ex post* holding period returns.

[11]In addition, Brigham *et al.* do not report on their treatment of serial correlation in reported regression results, making it more difficult to interpret their findings. As an example, monthly data are used for the 1980–1984 period in a time series regression of a risk premium on the level of interest rates. Similar regressions using data in this paper (1982–1984 monthly data) showed significant positive autocorrelation with Durbin Watson Statistics well below 1.0.

[12]The average values of σ_g are the market value weighted averages of the σ_g for individual stocks. If one looked at a direct estimate of g made by individual analysts for the index, one would expect to find a lower amount of dispersion because some of the differences on individual securities would cancel out. Such data are not available. One would suspect, however, that the calculated average would move up and down in tandem with this unobservable measure of dispersion.

Exhibit 6. Equity Risk Premia, Interest Rates and Risk



Another possible time series proxy for equity risk is the set of yield spreads between corporate and government bonds. As the perceived riskiness of corporate activity increases, the difference between yields on corporate bonds and government bonds should increase. One would expect the sources of increased riskiness to corporate bonds to also increase risks to shareholders.[13] Exhibit 6 graphs two series of yield spreads. The first is the difference between the yield on Moody's corporate average series and the yield on 20-year U.S. Treasury obligations. This series includes debt of both industrial and utility companies and thus would be appropriate as a risk proxy for a broad market index such as the SP500. The second is the spread between the yields on Moody's public utility series and 20-year U.S. Treasury bonds. This series should reflect relative risks of utility stocks as proxied by SPUT.[14]

Exhibit 7 reports results of analyzing the relationship between risk premia, interest rates, and proxies for risk for both the SP500 and SPUT. All regressions are corrected for serial correlation.[15] For stocks in general, Panel A shows that risk premia are negatively related to the level of interest rates — as proxied by i_{20}. Such a negative relationship may result from increases in the perceived riskiness of investment in government debt at high levels of interest rates. A direct measure of uncertainty about investments in government bonds would be necessary to test this hypothesis directly.

The results also show the significant positive relationship between the two proxies for risk and the estimated risk premia. For example, regression 4 of Panel A shows that the equity premium on the SP500 increases with the dispersion of FAF (σ_g) and the yield spread between corporate and government bonds ($i_c - i_{20}$). Evidently, these two risk measures capture somewhat different dimensions of risk, both of which appear important in explaining risk premia on stocks in general. The simple correlation coefficient between the two risk measures is 0.19 and is insignificantly different from zero. The addition of the yield spread risk proxy also dramatically lowers the magnitude of the coefficient on government bond yields, as can be seen by comparing Equations 1 and 3 of Panel A. Apparently, a large part of the effect of changes in government bond rates on equity risk premia may be explained through the narrowing of the yield spread between corporate and government bonds. This suggests that such increases in government yields may often be associated with a reduction in the *difference* in risk between investment in government bonds and in corporate activity.

Panel B shows that utility risk premia are also inversely related to the level of interest rates as was found by Brigham *et al.* [2]. Unlike the results for stocks in general, however, changes in the dispersion of FAF over time are not significantly related to changes in these utility risk premia. This may be be-

[13] Of course, counterexamples could be constructed but one would expect an overall positive correlation across companies. Additionally, the cross-sectional relationship between bond ratings and equity risk premia reported earlier in the paper supports the link between corporate debt risks and risks on equity.

[14] Note that these two series reflect both changes in the ratings of corporate bonds as well as yield spreads for a given bond rating. The two series proved better in explaining equity risk premia than use of two comparable series for AA-rated debt.

[15] Ordinary least squares regressions showed severe positive autocorrelation in many cases with Durbin Watson Statistics typically below one. Estimation used the Prais-Winsten method. See Johnston [10], pp. 321–325.

Exhibit 7. Changes in Equity Risk Premia Over Time — Entries are Coefficient (t-value)

Regression	Intercept	i_{20}	σ_g	$i_c - i_{20}$	R^2
A. SP500: Dependent Variable is Equity Risk Premium*					
1.	0.140	−0.632			0.43
	(8.15)†	(−4.95)†			
2.	0.118	−0.660	0.754		0.58
	(7.10)†	(−5.93)†	(3.32)†		
3.	0.069	−0.235		1.448	0.57
	(3.44)†	(−1.76)		(4.18)†	
4.	0.030	−0.177	0.855	1.645	0.79
	(2.17)†	(−2.07)†	(4.68)†	(7.63)†	
Regression	**Intercept**	**i_{20}**	**σ_g**	**$i_u - i_{20}$**	**R^2**
B. SPUT: Dependent Variable is Equity Risk Premium*					
1.	0.110	−0.510			0.37
	(7.35)†	(−4.41)†			
2.	0.101	−0.543	0.805		0.41
	(6.28)†	(−4.68)†	(1.42)		
3.	0.051	−0.259		1.432	0.80
	(5.54)†	(−4.05)†		(8.87)†	
4.	0.049	−0.287	0.387	1.391	0.80
	(5.15)†	(−3.87)†	(0.75)	(8.14)†	

*All variables are defined in Exhibit 1 and graphed in Exhibit 6. Regressions were estimated for the 36 month period January 1982–December 1984 and were corrected for serial correlation using the Prais-Winsten method. For purposes of this regression variables are expressed in decimal form, e.g., 14% = 0.14.

†Significantly different from zero at 0.05 level using two-tailed test.

cause of lower variability over time in the dispersion of FAF for utility stocks as compared to equities in general. The yield spread between utility and government bonds is significantly positively related to utility equity risk premia. And, as in the case of stocks in general, introduction of this spread substantially reduces the independent effect of interest rate levels on equity risk premia.

Given the short time series (36 months), tests for the stability of the relationships found in Exhibit 7 present difficulties. As a check, the relationships were reestimated dividing the data into two 18-month periods. For stocks in general (SP500), coefficients on σ_g and $(i_c - i_{20})$ were positive in all regressions and significantly so, except in the case of $(i_c - i_{20})$ for the second 18-month period. The coefficient of i_{20} was significantly negative in both periods. This confirms the general findings for the SP500 in Panel A of Exhibit 7. For utility stocks, results for the subperiods also matched the entire period results. The coefficients of $(i_u - i_{20})$ were significantly positive in both subperiods while those of σ_g were insignificantly different from zero. The level of interest rates (i_{20}) had a significant negative effect in both subperiods.

In summary, the estimated risk premia change over time and the patterns of such change are directly related to changes in proxies for the risks of equity investments. Risk premia for both stocks in general and utilities are inversely related to the level of government interest rates but positively related to the bond yield spreads which proxy for the incremental risk of investing in equities rather than government bonds. For stocks in general, risk premia also increase over time with increases in the general level of disagreement about future corporate performance.

VI. Conclusions

Notions of shareholder required rates of return and risk premia are based in theory on investors' expectations about the future. Research has demonstrated the usefulness of financial analysts' forecasts for such expectations. When such forecasts are used to derive equity risk premia, the results are quite encouraging. In addition to meeting the theoretical requirement of using expectational data, the procedure produces estimates of reasonable magnitude that behave as economic theory would predict. Both over time and across stocks, the risk premia vary directly with the perceived riskiness of equity investment.

The approach offers a straightforward and powerful aid in establishing required rates of return either for corporate investment decisions or in the regulatory arena. Since data are readily available on a wide range of equities, an investigator can analyze various proxy groups (*e.g.*, portfolios of utility stocks) appropriate for a particular decision. An additional advantage of the estimated risk premia is that they allow analysis of changes in equity return requirements over time. Tracking such changes is important for managers facing changing economic climates.

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THE WALL STREET JOURNAL.

Article 1 of 1

The Global Credit Crunch:
Junk-Bond Market Is Drying Up,
Hitting Companies Big and Small
By Gregory Zuckerman

10/07/98
The Wall Street Journal
Page A19

A gushing spigot has suddenly been turned off in the junk-bond market, and the resulting drought is being felt at companies both large and small.

Many growing companies looking to raise capital in recent years have headed for the junk-bond, or "high-yield," market. So, too, have struggling companies hoping to shore up cash reserves. As long as they were willing to pay investors a bond yield amounting to several percentage points more than they could receive on comparable Treasury securities, companies found investors eager to buy their bonds.

But in recent weeks, the market has shifted. **Global unrest** has sparked fear that a U.S. recession will result, crippling many second-tier companies. As a result, only the best quality corporations are now able to sell new bonds, a change that will likely force more companies to seek bankruptcy-law protection in the year ahead.

At the beginning of August, almost $25 billion of new junk-bond financing was set to hit the market. But the global economic unrest has unnerved both investors and Wall Street underwriters. The result: Fewer and fewer companies are able to raise necessary money by selling bonds.

"There's concern that the vast majority of high-yield companies can no longer come to the market" to sell bonds, said Robert Kricheff, Credit Suisse First Boston's head of high-yield research.

While the two-month dry spell ended recently with the sale of $1.4 billion of bonds for CalEnergy Corp. and $750 million of bonds from Chancellor Media Corp., these companies are highly rated issuers within the junk-bond community, and operate in relatively stable industries. Going forward, any company that doesn't share these characteristics may be unable raise financing by selling new bonds, at least until the economic turbulence subsides.

The shift in sentiment within the junk-bond market is reflected in the widening spread, or difference in yield, between junk bonds and safe

FOOTNOTE: 24

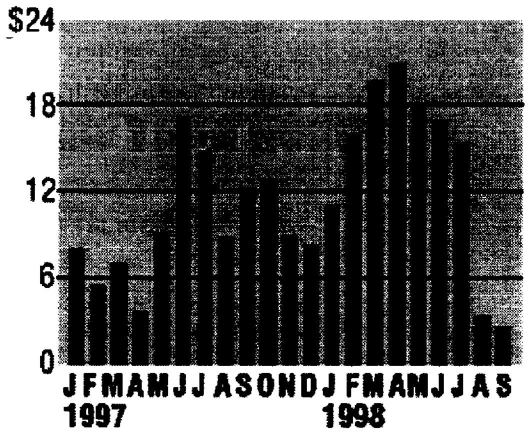
Treasurys. The spread has grown to almost six percentage points, up from under five points in mid-August and less than three points in April, according to Merrill Lynch. The spread is the widest since the early 1990s, an indication that investors are increasingly wary of buying junk bonds. What's more, little trading is going on, making it hard for both buyers and sellers.

Investors, who have gotten used to double-digit returns on junk bonds, are suddenly seeing huge losses. The average junk-bond mutual fund fell 7.19% in the third quarter, according to Lipper Analytical Services. And things could get worse.

"This shakeout isn't comparable to the devastation of the early 1990s, when the majority of the market overleveraged buyouts," says Martin Fridson, Merrill Lynch's high-yield chief. "But we're already seeing defaults and bankruptcies increase" and there are few signs of a turnaround soon in the market.

High-Yield Bonds

U.S. public and private high yield debt issuance, in billions



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Article 1 of 2
Business/Financial Desk; Section C
Small Telephone Company Is Victim of Credit Squeeze
By SETH SCHIESEL

10/23/98
The New York Times
Page 2, Column 5

Telegroup Inc., a small international telephone carrier that was flying high just six months ago, is on the verge of running out of cash and is weighing takeover offers from at least two communications companies, executives close to the discussions said yesterday.

With insolvency looming, **Telegroup** is the first major telecommunications casualty of the credit evaporation for companies that are smaller than huge. As markets around the world have devolved into turmoil, lenders have essentially halted financing for companies whose prospects are considered uncertain.

The squeeze could become particularly acute in the communications industry, with its high capital requirements and fierce competition. For instance, USN Communications Inc., a new local phone company, has seen its shares starved to 62.5 cents from a high of $23 in March, shortly after its initial public offering.

But while USN had only $47.2 million in revenue last year, **Telegroup** had sales of $337.4 million. And that is attracting suitors.

Primus Telecommunications Group Inc. and the IDT Corporation, two of **Telegroup** 's brethren as new, fast-growing communications carriers, have each made offers for **Telegroup** , executives close to the talks said.

Telegroup 's market value has decreased to about $110 million from around $775 million in April. The company expects revenue of about $105 million for the third quarter.

The company's shares closed at $3.25 yesterday, up 71.875 cents, in Nasdaq trading. Last Friday, the shares traded as low as $1.0313.

The run-up could be a product of speculation that there may be a bidding war for the company. But the Primus and IDT bids each would give next to nothing to the public holders of **Telegroup** 's stock, according to executives close to the discussions.

Instead, the offers are aimed directly at **Telegroup** 's bondholders, to whom the company owes about $105 million. The largest holders of **Telegroup** 's debt are Merrill Lynch & Company and Laurence A. Tisch's Loews Corporation, according to executives close to **Telegroup** .

But Merrill Lynch and Loews do not even have the first claim to **Telegroup** 's assets. In August, **Telegroup** gave that right to the Foothill Capital Corporation as part of a $12 million credit deal.

According to a **Telegroup** filing with the Securities and Exchange Commission,

FOOTNOTE: 25

November 2, 1998

Credit Markets

Telecommunications Issues Thaw Junk-Bond Freeze

By PAUL M. SHERER
Staff Reporter of THE WALL STREET JOURNAL

The ice is beginning to thaw in the junk-bond market.

In the last week or so a group of fast-growing companies, many of them in the telecommunications industry, have once again raised money in the junk, or "high yield," market. But bond-market analysts warn that while the market is beginning to reopen to seasoned companies, they're having to pay up. And companies that haven't tapped the high-yield market are likely to still find it an inhospitable environment.

1 Agency Proposes Rules to Maintain Soundness of Fannie Mae, Freddie Mac

2 More information on bond trading from Briefing.com

Eight deals raised $2.57 billion in high-yield bonds last week, according to CommScan LLC, with telecom companies issuing the lion's share of new debt. **McLeodUSA** Inc., a Iowa-based competitive local exchange carrier, or CLEC, started the parade Oct. 22 by raising $300 million. (CLECs provide local telephone service in competition with regional Bell companies).

Last week also saw issues of $750 million from **Qwest Communication International** Inc., a builder of fiber-optic networks, $300 million from wireless operator **Nextel Communications** Inc., and $350 million from U.K. cable operator **TeleWest** PLC.

Meanwhile, **Winstar Communications** Inc. showed that vendor financing-loans provided by equipment sellers to large buyers-remains an alternative source of capital. The New York CLEC agreed Oct. 22 to obtain up to $2 billion in equipment financing from **Lucent Technologies** Inc.

The deals came as a relief to communications companies, which had been nearly shut out of the junk-bond market for weeks. There were only six high-yield telecom issues in August and September, raising $1.2 billion. That was down sharply from 33 issues raising $8 billion in the same period last year, according to New York-based CommScan.

Shares of the telecom companies have rallied on the funding news, after being battered during August and September. Investors had feared the companies could run out of money before completing their networks.

But despite the signs of life, market participants believe many fast-growing companies can no longer count on the same easy funding that has propelled their growth. The initial-public-stock-offering market remains shut for start-up companies, while borrowers report increasing caution on the part of bank lenders. Some companies may no longer be able to issue high-yield bonds, while others will only be able to do so by paying higher yields.

"I think we have seen a fundamental change in the cost of funding for these kinds of companies," says Michael Guarnieri, director of high yield research at Lehman Brothers Inc. "Whereas in early 1998 and throughout 1997 it seemed like anything could get done, the [high-yield] market will be more disciplined going forward, and only more seasoned telecom companies are going to be able to access the market. For companies that aren't seasoned, it just won't be there."

The flood of new issues last week came from better established companies already familiar to investors, says Kevin Mathews, senior portfolio manager at Pilgrim America High Yield Fund in Phoenix. "The bottom tier and middle tier of the high-yield market is still very shaky, and people are being cautious."

The returns demanded by investors holding junk bonds have soared since the global financial crisis hit the U.S. in August, though they've since come off their peak. The Lehman Brothers High Yield Index showed that the difference between the yield of

FOOTNOTE: 26 & 33

high-yield bonds and safe U.S. Treasury bonds rose from 3.06 percentage points at the end of September 1997 to 6.81 percentage points at the end of September 1998, said Mr. Guarnieri.

Companies issuing last week generally paid between a quarter and a full percentage point more than the rates on their existing bonds. **PSINet** Inc.'s $200 million issue Tuesday, for example, was about a percentage point more expensive, Mr. Guarnieri says.

The six high-yield telecom issues in October, which raised $2.44 billion, cost on average 5.728 percentage points above U.S. Treasuries. The spread in October 1997 was 4.726 percentage points, on 23 deals raising $5.36 billion, according to CommScan.

The tightness has companies like **GST Telecommunications** Inc. watching cash more carefully. Like other companies in its field, GST is spending heavily as it builds its fiber optic and data network. The company invested $215 million last year on its expansion and expects to spend a further $250 million this year. Its growth has been funded in large part by the $900 million of high-yield bonds it issued since December 1995.

GST Chief Executive Joseph A. Basile Jr. says he can't predict what the capital markets will do, but the company isn't taking any chances. Coming into the recent turmoil, GST already had capital in place to last through the end of 1999. "By changing the way we employ capital ... we think we can extend that an additional six months," Mr. Basile says.

To stretch out its capital, GST has cut $50 million from its expansion plans and is considering cutting $50 million more. It has chosen to lease rather than build some facilities, has postponed some expansion plans, and will rely more heavily on outsourcing. For example, it will delay its entry into the Dallas market from 1999 to 2000, and in Seattle it will build a smaller infrastructure and rely more heavily on facilities leased from the local Bell operator.

GST intends to be prepared if the funding tightness proves more than a short-term problem. "We are looking at something that will continue for the next few months at least," Mr. Basile says. "If it appears it will extend beyond that, we will look at other opportunities with vendor financing, to make sure we have the liquidity we need." But if the high-yield markets bounce back faster than expected, "we want to position ourselves to be able take advantage of that change."

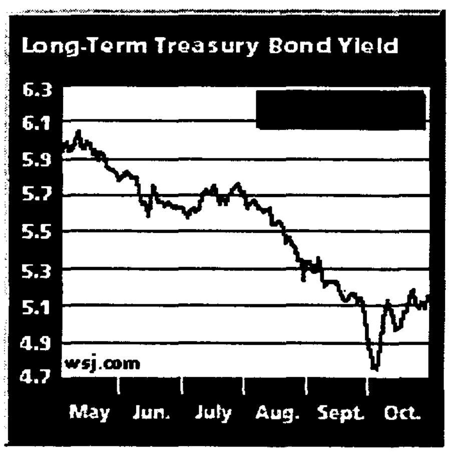
The funding downturn also has some private equity investors looking at new acquisition opportunities. Charterhouse Group International Inc. says it will move beyond its traditional investments in private companies to begin investing in "capital-constrained public companies." New York-based Charterhouse will make equity investments of up to $200 million each as a minority investor.

For cash-starved companies, "they're either not going to get capital, or they will look to an alternative source of capital," says Merril M. Halpern, Charterhouse chairman and CEO. "That's one of the reasons we're interested in pursuing this market."

"It may not be as severe over the intermediate term as it is at the moment, but I expect the debt markets and the high-yield debt markets in particular to be rather weak for the intermediate term," Mr. Halpern says. He also sees continuing softness in the market for initial and follow-on public offerings. "I think the liquidity shortage is more than a short-term impact."

Friday's Market Activity

The bond market declined Friday after a statement by the Group of Seven leading industrial nations eased fears of global market turmoil, causing investors to exit the safety of Treasurys.



Late Friday the benchmark 30-year Treasury bond fell 1 6/32 points, or $11.88 for a bond with $1,000 face value, to 105 5/32. Its yield rose to 5.151% from 5.076% late Thursday, as bond yields move in the opposite direction of prices.

The G-7, in its second statement during October, said Friday that the International Monetary Fund will establish a precautionary line of credit to help countries avert global financial contagion before their economies are hit.

That announcement helped ease worries about the outlook for financial markets, continuing a process that has been under way since Oct. 15 when the Federal Reserve cut interest rates between its scheduled meetings.

"You've taken that uncertainty out of the market and people can move to other markets and leave Treasurys," said William Lloyd, head of market strategy at Barclays Capital.

Increased competition will weaken the strength that the local telephone companies derive from their dominant market positions. However, industry fundamentals have allowed these companies to improve their financial capacity to service debt as competition has risen. Standard & Poor's anticipates that well managed local exchange companies will be able to continue to offset rising business risk with greater financial strength for the foreseeable future, resulting in fairly stable credit quality for this industry segment as a whole.

Long-distance carriers will lose some of their long-distance customers to GTE and the RBOCs. This market share loss is not likely to be rapid enough to destabilize credit quality for the long-distance industry as a whole, but the impact will vary widely from company to company. Some long-distance companies may suffer heavy losses of business; others may gain much more than they lose by providing services to the RBOCs and GTE. This may result in significant rating changes for the smaller long-distance carriers, but it is unlikely to impact credit quality for the long-distance segment as a whole.

Frank Plumley, New York (212) 208-1996

STANDARD & POOR'S INSURER REALTY MODEL

In a Credit Comment in the Jan. 8, 1996 edition of *CreditWeek*, "Model Shows Insurer Realty Holdings Still Overvalued, " a table contained incorrect information on additional reserves. The corrected table is printed below. The text corresponding to the table should have read "As table 1 indicates, the average company's portfolio was overvalued by 14.6% on a liquidation basis and 4.0% on an ongoing basis. Foreclosed properties were even worse, averaging overvaluation of 18.7% on a liquidation basis and 9.0% on an ongoing basis."

Mark Puccia, New York (212) 208-1901
Jayan Dhru, New York (212) 208-8804

Table 1
Additional Reserves - 1994

	Investment Properties			Foreclosed Properties	
Company	Liquidation	Ongoing	Company	Liquidation	Ongoing
A	(40.47)	(33.41)	K	(46.62)	(38.52)
Q	(36.40)	(27.57)	O	(36.30)	(26.00)
B	(32.67)	(26.03)	H	(35.73)	(25.08)
C	(29.75)	(17.71)	J	(30.87)	(20.34)
D	(29.18)	(21.04)	D	(29.69)	(19.48)
E	(28.97)	(17.67)	N	(28.91)	(18.03)
F	(26.16)	(14.63)	R	(24.77)	(17.08)
G	(24.45)	(12.58)	C	(23.98)	(13.07)
H	(19.36)	(10.19)	I	(23.75)	(13.94)
I	(17.43)	(8.15)	B	(22.19)	(9.09)
O	(17.28)	(7.16)	E	(20.07)	(10.59)
J	(15.74)	(7.11)	F	(17.86)	(9.49)
K	(12.28)	(0.45)	G	(17.03)	(7.27)
P	(10.03)	(0.22)	M	(14.01)	(5.39)
L	(9.65)	0.61	S	(13.78)	(5.59)
M	(9.51)	3.86	T	(11.79)	(2.74)
N	(9.14)	4.73	L	(11.02)	(0.96)
R	(4.66)	9.12	P	(8.44)	0.23
S	1.91	13.50	A	(8.13)	(1.04)
T	5.20	21.39	Q	(5.40)	5.21
U	6.70	21.15	U	(1.46)	8.97
V	9.53	18.30	V	(0.24)	9.70
W	13.05	20.07	W	2.63	14.28
Simple Average	(14.64)	(3.96)		(18.67)	(8.93)
First Quartile	(27.56)	(16.15)		(26.84)	(17.55)
Median	(15.74)	(7.11)		(17.86)	(9.09)
Bottom Quartile	(6.90)	6.93		(9.73)	(1.00)

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GTE CORP. NYSE-GTE	RECENT PRICE 44	P/E RATIO 15.8 (Trailing: 16.9; Median: 14.0)	RELATIVE P/E RATIO 1.03	DIV'D YLD 4.3%	VALUE LINE	754

TIMELINESS 3 Average (Relative Price Perform-ance Next 12 Mos.)

SAFETY 1 Highest (Scale: 1 Highest to 5 Lowest)

BETA .80 (1.00 = Market)

																Target Price Range
High:	15.5	21.3	22.4	22.9	35.6	36.0	35.0	35.8	39.9	35.3	45.1	49.3				1999 / 2000 / 2001
Low:	12.7	15.1	14.7	16.9	21.4	[illegible]	27.5	28.9	34.3	29.6	30.1	41.0				

1999-01 PROJECTIONS

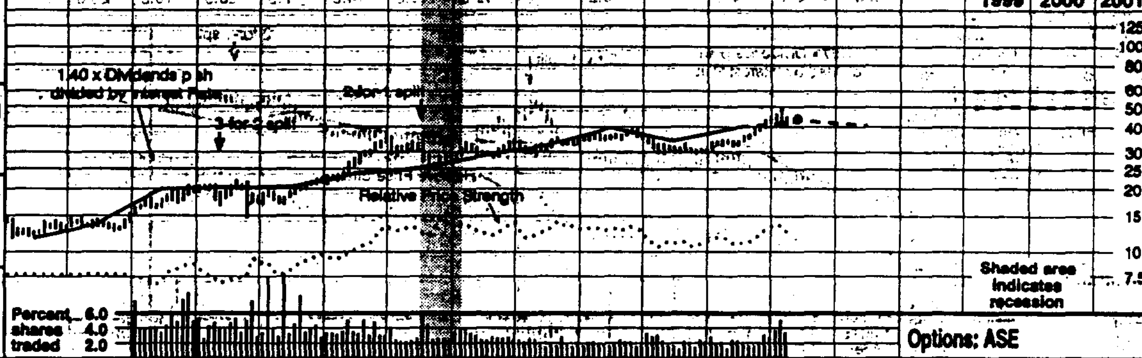
	Price	Gain	Ann'l Total Return
High	60	(+35%)	12%
Low	50	(+15%)	8%

Insider Decisions

	A	M	J	J	A	S	O	N	D
to Buy	0	0	0	0	0	0	0	0	0
Options	1	1	0	0	1	0	0	2	0
to Sell	1	1	0	0	2	0	1	1	0

Institutional Decisions

	2Q'95	3Q'95	4Q'95
to Buy	248	234	240
to Sell	248	230	234
Hld's(000)	381240	381739	396733



1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	© VALUE LINE PUB., INC.	99-01
21.48	22.18	22.28	22.63	23.74	24.76	22.90	23.68	25.22	26.38	24.67	22.07	21.27	20.75	20.67	20.47	21.80	23.10	Revenues per sh	27.05
3.45	3.98	4.21	4.68	4.86	4.17	5.10	5.48	5.73	6.04	5.70	5.57	5.38	5.77	5.92	6.36	6.75	7.20	"Cash Flow" per sh	8.40
.94	1.37	1.46	1.58	1.78	1.72	1.69	1.62	1.77	2.08	1.93	1.92	1.95	2.20	2.38	2.61	2.85	3.20	Earnings per sh A	4.25
.91	.93	.96	.99	1.01	1.04	1.11	1.24	1.30	1.40	1.52	1.64	1.76	1.84	1.88	1.88	1.88	2.00	Div'ds Decl'd per sh B■	2.65
5.75	5.83	5.33	4.78	5.75	5.59	4.73	4.83	4.73	4.88	3.98	4.46	4.16	4.09	4.34	4.14	4.80	4.55	Cap'l Spending per sh	4.40
9.65	9.94	10.50	11.30	12.03	10.75	11.61	11.92	12.45	12.01	11.84	12.21	10.61	9.96	10.85	7.05	7.80	9.40	Book Value per sh C	14.85
464.65	497.10	541.49	571.94	612.71	635.52	659.92	651.10	652.58	660.60	867.00	888.91	939.53	951.76	965.09	975.06	975.00	985.00	Common Shs Outst'g D	1025.00
9.5	7.1	7.3	9.1	7.3	8.1	10.6	12.1	11.2	13.3	15.5	16.0	16.8	16.5	13.2	13.8	Bold figures are		Avg Ann'l P/E Ratio	13.0
1.26	.86	.80	.77	.68	.66	.72	.81	.93	1.01	1.15	1.02	1.02	.97	.87	.94	Value Line		Relative P/E Ratio	1.00
10.1%	9.5%	9.0%	6.9%	7.8%	7.5%	6.1%	6.3%	6.6%	5.1%	5.1%	5.3%	5.4%	5.0%	6.0%	5.2%	estimates		Avg Ann'l Div'd Yield	4.8%

CAPITAL STRUCTURE as of 12/31/95

Total Debt $14.9 bill. Due in 5 Yrs $4.44 bill.
LT Debt $12.7 bill. LT Interest $1.0 bill.
(LT interest earned: 5.0x; total interest coverage: 4.6x)

Pension Liability None

Pfd Stock None

Common Stock 975,060,560 shs.

1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997		99-01
15112	15421	16460	17424	21393	19621	19984	19748	19944	19957	21250	22750	Revenues ($mill)	27750
1091.5	1134.2	1224.7	1417.3	1715.0	1733.0	1787.0	2095.0	2288.0	2527.0	2800	3150	Net Profit ($mill)	4325
42.9%	33.6%	33.5%	31.3%	30.7%	31.6%	35.1%	35.1%	38.5%	36.6%	37.0%	37.0%	Income Tax Rate	37.0%
7.2%	7.4%	7.4%	8.1%	8.0%	8.8%	8.9%	10.6%	11.5%	12.7%	13.2%	13.8%	Net Profit Margin	15.6%
50.2%	50.5%	49.8%	52.8%	53.8%	55.9%	55.6%	54.5%	49.9%	58.3%	63.0%	58.5%	Long-Term Debt Ratio	49.5%
42.5%	40.9%	41.7%	38.4%	39.6%	37.8%	39.1%	39.7%	43.0%	31.5%	37.0%	41.5%	Common Equity Ratio	50.5%
18024	18985	19500	20658	25948	28688	25509	23874	24377	21845	20500	22300	Total Capital ($mill)	30200
21128	22002	22967	23700	29284	29323	29820	28720	29328	22437	22400	22200	Net Plant ($mill)	21000
8.8%	8.6%	8.9%	9.6%	9.3%	8.7%	9.8%	11.4%	12.3%	15.4%	16.0%	16.5%	% Earned Total Cap'l	16.0%
13.2%	13.2%	13.7%	16.3%	15.7%	15.0%	17.4%	21.5%	21.6%	36.8%	37.0%	34.0%	% Earned Net Worth	28.5%
13.8%	14.1%	14.5%	17.3%	16.3%	15.6%	17.7%	21.9%	21.8%	36.8%	37.0%	34.0%	% Earned Com Equity	28.5%
4.4%	3.6%	4.0%	5.6%	6.2%	2.4%	1.9%	3.7%	4.6%	10.2%	12.50%	13.0%	% Retained to Com Eq	10.5%
69%	75%	74%	69%	63%	85%	89%	83%	79%	72%	65%	62%	% All Div'ds to Net Prof	62%

CURRENT POSITION ($MILL.)

	1993	1994	12/31/95
Cash Assets	322.0	323.0	332.0
Other	5626.0	5311.0	5560.0
Current Assets	5948.0	5634.0	5892.0
Accts Payable	1968.0	2229.0	3858.0
Debt Due	1644.0	2042.0	2156.0
Other	4321.0	3950.0	2298.0
Current Liab.	7933.0	8221.0	8312.0
Fix. Chg. Cov.	344%	438%	439%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '93-'95 to '99-'01
Revenues	-1.5%	-4.0%	4.5%
"Cash Flow"	3.0%	.5%	5.5%
Earnings	3.5%	4.5%	10.0%
Dividends	6.5%	6.0%	6.0%
Book Value	-2.0%	-5.0%	8.0%

Cal-endar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
1993	4826	4916	4943	5063	19748
1994	4746	4955	4995	5248	19944
1995	4665	4932	4996	5364	19957
1996	5000	5300	5400	5550	21250
1997	5350	5700	5800	5900	22750

Cal-endar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
1993	.48	.51	.59	.62	2.20
1994	.52	.55	.64	.67	2.38
1995	.56	.60	.71	.74	2.61
1996	.61	.66	.77	.81	2.85
1997	.68	.74	.87	.91	3.20

Cal-endar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
1992	.425	.425	.455	.455	1.76
1993	.455	.455	.455	.47	1.84
1994	.47	.47	.47	.47	1.88
1995	.47	.47	.47	.47	1.88
1996	.47	.47			

BUSINESS: GTE is the largest U.S.-based local telephone company. It serves 24.1 million access lines in 28 states, Canada, the Dominican Republic, and Venezuela. GTE, the nation's second-largest provider of cellular-service, offers wireless services in 74 metropolitan statistical areas amounting to 56 million POPs (potential cellular subscribers in licensed markets). Other operations include government systems, telecommunications products, and directory publishing. 1995 depreciation rate: 7.2%. Est. plant age: 8 years. Has 106,000 employees, 563,000 stockholders. Officers & Directors own less than 1% of common (3/96 Proxy). Chmn. & C.E.O.: Charles R. Lee. Inc.: New York. Addr.: One Stamford Forum, Stamford, CT 06904. Tel.: 203-965-2000.

Excluding one-time charges, GTE posted a solid earnings performance in 1995. Share net rose about 10% thanks to growth in wireline and wireless service revenue, cost-cutting measures, and a small share-buyback program. Separately, the company took a noncash $4.6-billion after-tax charge relating to the discontinuance of an accounting standard that extended the depreciation time of certain assets. The effect was to reduce net plant by $7.4 billion and net worth by $4.6 billion.

The strength of GTE's core operations suggests an 8%-10% share-net gain in 1996. Revenues from wireline services are rising steadily due to the higher number of access lines served and the successful marketing of value-added services (caller I.D., call waiting, voice messaging etc.). We believe total access-line growth will be healthy again this year, but less than the 5.8% realized in 1995. Value-added services will probably increase 30%-35%. Cellular service operations continue to be a bright spot, as revenues rose 31% last year. We expect this pace to continue, as the market expands to include more casual users. Also, in order to retain wireless customers, GTE will likely offer volume benefits and paging services. On the cost side, the company's ongoing reengineering program (involving the consolidation of work centers and the reduction of 17,000 personnel) will likely prove to be beneficial by helping to widen the operating margin. In all, we look for these factors to lift share earnings to $2.85 this year and to $3.20 in 1997.

GTE has begun offering long distance service. Pursuant to the Telecommunications Act of 1996, the company was immediately freed to offer long distance service. At present, GTE has limited operations in Minnesota and Michigan, with plans to expand service to 12 of its key states by yearend. Due to the high start-up costs, however, this service probably won't contribute to earnings until 1997.

GTE stock is neutrally ranked for the year ahead. The current price seems to discount a portion of the earnings improvement we're projecting to 1999-2001. Therefore, 3- to 5-year price appreciation potential is below average.

Marc H. Bettinger *April 12, 1996*

(A) Primary earnings. Excludes nonrecurring gains (losses): '80, (31¢); '82, 5¢; '83, 3¢; '84, 9¢; '85, ($3.36); '86, 14¢; '87, (2¢); '91, (17¢); '92, ($2.81); '93, ($1.27); '94, 17¢; '95, ($4.82). Next earnings report due late April.
(B) Next dividend meeting May 9th. Goes ex about May 17th. Div'd payment dates: Jan. 1, April 1, July 1, and Oct. 1. ■ Div'd reinvestment plan available.
(C) Incl. intang. In '95: $2765.0 mill., $2.84/sh.
(D) In millions, adjusted for stock splits.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	55
Earnings Predictability	95

To

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The economics of private placements: Middle-market corporate finance, life insurance companies, and a credit crunch
Stephen D Prowse

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This article examines the private placement market for corporate debt and the recent **credit crunch** in that market.

This article examines the private placement market for corporate debt and the recent **credit crunch** in that market. Neither the private placement market nor the crunch have received much attention from economists, but both are important. The private market is a significant source of funding for medium-sized companies. Starting in the early 1990s, the **credit crunch** in the private market cut off most belowinvestment-grade companies from a traditional source of long- term funds; it is an example of a mechanism of credit market disruption that economists have yet to focus on.

The article first examines the structure of the private placement market, including contract terms and who the typical borrowers and lenders are. The private placement market is an information-intensive market that shares much with the more familiar bank loan market: borrowers and lenders typically negotiate lending terms, lenders evaluate and monitor borrowers' credit risk, covenants are used to control risk, and borrowers generally lack access to public debt markets because they are too information-problematic for public market investors to evaluate.' As in the bank loan market, a key activity of lenders in the private placement market is the gathering and production of information about borrowers' credit quality. However, there are also significant differences from the bank loan market: debt instruments in the private placement market are securities rather than loans, maturities of private placements are much longer than those of bank loans, interest rates are fixed rather than floating, and the principal financial intermediaries investing in private placements are life insurance companies, not banks.

The article also analyzes the **credit crunch** that occurred in the below-investment-grade sector of the private placement market in the early 1990s. Credit crunches have long been an interesting and controversial topic, because producing compelling evidence that a crunch occurred is often difficult and because economists have proposed a variety of mechanisms that can cause crunches. For the recent **credit crunch** in the private placement market, relatively extensive evidence is available. In addition, the causes of the crunch appear to differ from the standard ones proposed in the academic literature. Another interesting aspect of this **credit crunch** is that it apparently continues to this day, long after its initial causes--financial problems at life insurance companies and a policyholder focus on the industry's belowinvestment-grade bond investments--appear to have waned. I examine some possible reasons for the persistence of the crunch.

The structure of the private placement market

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A private placement is a debt security issued by a firm that is exempt from registration with the Securities and Exchange Commission (SEC). By law, private placements must be sold only to a limited number of sophisticated investors (typically life insurance companies). Both initial offerings and secondary transactions of private placements are restricted in this fashion.

This article focuses on the traditional market for privately placed debt, which is distinct from the so-called Rule 144A market for private debt securities. Rule 144A, adopted by the SEC in 1990, provides more formal exemption from registration for secondary transactions in private placements. It has essentially evolved into a quasi-public market that is quite distinct from the traditional market. Most borrowers in the Rule 144A market are less informationproblematic than traditional market borrowers. Lenders include traditional public bond buyers such as mutual funds and pension funds as well as life insurers; securities very often have registration rights attached to them and are formally underwritten (as in the public bond market), as opposed to sold on a "best- efforts" basis by agents (as in the traditional private market). There is generally substantially less gathering and production of information on borrower credit quality by lenders in the Rule 144A market.2

Private placements are a significant source of funds for U.S. corporations. During 1994-96, gross issuance of private placements by nonfinancial corporations was almost 40 percent of that in the public market. For a few years in the late 1980s, private issuance actually exceeded public issuance (Figure 1). The surge in public issuance in periods of falling interest rates (for example, in the mid-1980s and early 1990s)--which primarily reflects refinancing activity-has not been matched by private issuance because most private bonds carry punitive prepayment penalties, making refinancing unattractive.3 The market size in terms of the outstanding stock of bonds also suggests that the private placement market is an important one. At year-end 1996, the nonfinancial corporate sector had about $450 billion of private placements outstanding, roughly 70 percent of the amount of bank loans ($640 billion) and almost 50 percent of the amount of public bonds ($950 billion) outstanding.4

Table 1 sets out some of the differences in contract terms, borrowers, and lenders between the private placement market and the two other major debt markets--the public bond and bank loan markets. Many of these differences are consistent with the notion that, for many firms, these are very distinct markets to which there is a hierarchical pattern of access. In other words, there are many firms that are too informationproblematic to borrow in the public bond market--they need to take advantage of the intensive due diligence and monitoring in the private placement or bank loan market. Of these, the most information-problematic firms are probably restricted to the bank loan market, where the most intensive monitoring takes place. Thus, the private placement market is a much more information-intensive market than the public bond market but probably somewhat less information-intensive than the bank loan market.

Contract terms and borrowers. Contract terms differ substantially across the three debt markets listed in Table 1. On average, private placements are larger than bank loans and smaller than public bonds. Carey et al. (1993) report that in 1989 roughly 80 percent of all private placement issues ranged from $10 million to $100 million. In contrast, more than 80 percent of all bank loans ranged from $10,000 to $1 million, while more than 80 percent of all public bonds issued ranged from $100 million to $500 million.

Maturities of private placements are generally longer than those of bank loans but shorter than those of public bonds. Bank loans have relatively short maturities--Carey et al. (1993) report that in 1989 roughly 80 percent of all bank loans were for less than one year. Private placements are generally of intermediate to long term (between seven and fifteen years) maturity--more than half of all private placements issued in 1989 were within this maturity range. Finally, public bonds are typically long term--roughly 70 percent of all public bonds issued in 1989 were longer than ten years in maturity.

Figure 1

Table 1

The use of covenants also varies substantially across these three debt markets. Covenants are a mechanism lenders use to control risk. Affirmative covenants require a borrower to meet certain standards of behavior. They include requirements that the firm stay in the same business and meet its legal and contractual obligations. Affirmative covenants are common in all three debt markets. Negative covenants restrain the borrower from taking actions that would be detrimental to debtholders. They include restrictions on capital expenditures, the sale of assets, dividends, merger and acquisition activity, and the amount of additional debt the firm can take on. Finally, financial covenants restrict measurable financial variables and can stipulate minimums to be maintained on capital, interest coverage, and the ratio of assets to liabilities.

The frequency and tightness of negative and financial covenants in both the bank loan and private placement markets vary with the degree of information problems the firm poses to outsiders and its observable credit risk. "Tightness" refers to the likelihood that a particular covenant will be binding in the future. Both private placements and bank loans for more information-problematic firms often contain many financial and negative covenants, whereas covenants are fewer and looser (that is, with minimum values further from current values) in both markets for firms that pose fewer information problems. In particular, however, bank loan agreements appear to contain more and tighter covenants than private bonds, even for borrowers with the same characteristics, while negative or financial covenants in public bonds are extremely rare.5

Since covenants limit a borrowing firm's financial and operational flexibility, there are usually either implicit or explicit prov isions for contract renegotiation, whereby the lender can examine requests for a waiver or relaxation of a covenant. Lenders that offer such provisions must of course have the ability to monitor and evaluate borrowers and the effect on their creditworthiness of relaxing particular provisions in the debt contract. The more frequent and tighter covenants in bank loans mean that covenant renegotiation is most frequent in this market. However, renegotiation is also quite frequent in private placements, while renegotiation is extremely rare in public bonds.6

These cross-market differences in contract terms are usually consistent with the notion that firms posing the greatest information problems for outside investors are generally restricted to the bank loan market, firms with less severe information problems have access to the private placement market, and only those large public firms with the fewest information problems can access the public bond market. In other words, different debt markets specialize in providing financing to borrowers that differ in the degree of information problems they pose to investors.

Cross-market patterns of issue size are consistent with this notion. The information problems borrowers pose to lenders span a spectrum. Firm size is an important determinant of where on this spectrum a firm is because size is correlated with age and the length of a track record. Size is also related to the number of externally visible contracts the firm has, as well as to the firm's stake in its own reputation. Of course, borrower size is also highly correlated with issue size. Thus, smaller borrowers, which make smaller issues, are often less wellestablished and less well-known firms; consequently, they require more due diligence and loan monitoring by the lender. In fact, as Carey et al. (1993) show, borrowers in the public market are substantially larger than borrowers in the private placement market, which are in turn substantially larger than firms that are restricted to the bank loan market for raising funds.

Cross-market patterns of covenants are also consistent with the notion that each debt market serves borrowers differing in the degree of information problems posed to lenders. Information-problematic firms are subject to covenants that limit their risk-taking ability. But in order not to restrict the firms' activities too much, there must be room for renegotiating them at appropriate times. This can only occur in markets where the lenders are willing and able to renegotiate. Information-problematic firms cannot borrow in the public market because covenants are not effective there, since public lenders have little capacity for monitoring.

Differences in maturity between the bank loan and private placement markets appear related to the liability structures of the differing lenders in each market. Banks have shortterm, floating-rate liabilities, which they can match with short-term, floating-rate loans. Conversely, life insurance companies have primarily long-term, fixed-rate liabilities, which are conveniently matched by private placement investments. Although banks could in principle make long-term, fixed-rate loans and execute swaps to obtain payment streams matching their floating-rate liabilities, they seldom do so. Perhaps this is because the transactions costs of such swaps are too high. An alternative explanation, however, is that the different markets serve borrowers that differ in terms of the credit evaluation and monitoring they require, and that in equilibrium the different credit analysis requirements require different maturities to be most efficient. For example, the tighter the covenants used to control borrower behavior, the shorter the maturity of the contract needs to be to provide flexibility for the borrower.

Lenders. Market participants estimate that life insurers purchase between 50 and 80 percent of all private placement issues. Carey et al. (1993) provide evidence supporting estimates at the high end of this range. Foreign and commercial banks, pension funds, finance companies, investment banks, and thrifts are all minor players in the market. As mentioned above, one reason for life insurers' dominance is that they are uniquely suited to investing in private placements because the fixed-rate, intermediate- to long-term nature of the security can be easily matched with their liabilities. At year-end 1995, life insurers held about $250 billion of private placements, representing about 14 percent of their general account assets and 37 percent of their total corporate bond holdings.7 Within the life insurance industry, private placement lending is concentrated in the hands of the largest twenty insurers, which hold about 70 percent of total life insurance industry private placement holdings.8

Life insurance companies are informationintensive lenders--that is, they conduct both substantial due diligence on the borrower before making the loan and continuous monitoring after the loan is made. Thus they have large investments in risk-control technologies. Most insurers have traditionally had large staffs of credit analysts, who evaluate the credit quality of potential borrowers and monitor the health of firms to which credit has been extended. Most review each private placement in their portfolio quarterly and conduct a more formal semiannual or annual review. Violations of or requests for renegotiation of covenants generate further reviews. The costs of riskcontrol operations are covered by the higher risk-adjusted yield of private placements relative to public bonds, which require little or no active monitoring by securityholders.

Their large investments in credit evaluation and monitoring have traditionally led most life insurance companies to focus on more complex and lower rated credits, and the industry's expertise in investing in such bonds has largely been built up over the postwar period. For example, Shapiro (1977) notes that between 1960 and 1975, the share of insurers' annual commitments to private placements devoted to bonds rated Baa or below was roughly 60 percent, with the share going to below-investmentgrade private bonds (those rated Ba or below) at roughly 20 percent. As late as 1990, insurers were still following this investment pattern: at year-end 1990 the life insurance industry held 56.8 percent of its total private bond holdings in bonds rated Baa or below, with 19.8 percent in bonds rated below investment grade. As described in the next section, however, in 1990 and 1991 the share of insurance industry commitments to below-investment-grade bonds was abruptly and sharply lowered, a phenomenon I call a " **credit crunch** ."

The **credit crunch**

Table 2

The private placement market is fundamentally an information- intensive market, with life insurance companies as the principal intermediaries. One feature all intermediaries share is their vulnerability to withdrawals of funds by liabilityholders, or runs, with consequent disruptions in the markets in which they lend. This section investigates an example of a disruption in the private placement market.9

Starting in mid-1990, issuers of belowinvestment-grade securities encountered a sharp contraction in the availability of credit in the private placement market. A coincident sharp rise in interest rate spreads on these securities suggests that the reduction in supply was larger than any decline in credit demand associated with the weak economy in that period. The primary mechanism for this **credit crunch** appears to have been asset-quality problems at life insurance companies in 1990 and 1991, which focused regulatory, stock market, media, and policyholder attention on the financial solvency of life insurers. For a variety of reasons, such attention focused on the share of belowinvestment-grade bonds on life insurance company balance sheets: insurers with a high share were penalized by lower stock prices, unfavorable media reports, and slower sales growth of life insurance products. Insurers thus began competing with each other not just on price but also on the basis of the share of belowinvestment-grade bonds on their books. As a result, insurers stopped buying below-investment-grade bonds, precipitating a crunch in the private market for these bonds where they had previously been the dominant investors.10 In other words, there was a flight to quality by life insurance companies.

This flight-to-quality mechanism differs somewhat from those proposed by economists. It is most closely related to the class of models that focuses on runs caused by liabilityholder concerns about financial intermediaries' solvency. However, unlike in these models, no actual runs occurred to trigger a flight to quality by an insurance company.

One surprising aspect of the **credit crunch** is its persistence. Even today, life insurers appear to be infrequent purchasers of belowinvestment-grade private bonds, while gross issuance remains low and spreads remain high, despite the fact that solvency concerns about life insurance companies and concerns about below-investment- grade bonds have largely been put to rest. I investigate reasons for the persistence of the crunch.

Definition of a **credit crunch** . Many definitions of the term **credit crunch** appear in the literature (see Clair and Tucker 1993 for a review). My definition is that, for a given price of credit, lenders substantially reduce the volume of credit provided to a group of borrowers whose risk is essentially unchanged. That is, a **credit crunch** is caused by a reduction in lenders' willingness to make risky investments--in terms of a supply-and-demand diagram, a **credit crunch** is a substantial leftward shift in the supply of credit, when the shift is not principally due to an increase in the riskiness of borrowers.11

Note that a supply shift alone does not imply a **credit crunch** , as the supply curve may shift due to an increase in the risk iness of borrowers. Thus my **credit crunch** definition does not encompass the reduction in supply that is a normal response by lenders in a recession. In a recession, borrower riskiness normally increases, and lenders demand compensation either in higher interest rates or in tighter nonprice credit terms. Although borrowers might characterize such a reduction in credit as a **credit crunch** , such a characterization would be incorrect because the decrease in credit is a normal response of lenders to changing conditions. Cantor and Wenninger (1993) refer to this situation as a "credit slowdown."

My definition of a **credit crunch** differs from some, notably that of Owens and Schreft (1992), in that it does not require that the credit reduction be accomplished by nonprice rationing. The reduction may be effected entirely by an increase in the relative price of credit, as would normally occur in response to a leftward shift in the supply curve, or by some combination of price increase and nonprice rationing.

Evidence for a **credit crunch** . Events in the below-investment-grade sector of the private placement market in the early 1990s qualify as a **credit crunch** because gross issuance of below-investment-grade private placements declined substantially and spreads on such debt increased sharply, whereas spreads on investment-grade private debt declined. A general increase in the riskiness of borrowers due to the 1990-91 recession cannot account for these phenomena.12

Data from three sources confirm a reduction in issuance of below-investment-grade private placements. First, gross issuance by belowinvestment-grade nonfinancial corporations fell by more than 50 percent in 1991, a much steeper drop than issuance by investment- grade corporations (Table 2).13 As a share of gross offerings, below- investment-grade issuance declined from 16 percent in 1990 to about 10 percent in 1991 and 1992, and 6 percent in 1993. Note also that the share of below-investmentgrade issuance continued to fall through 1995. I will return to the persistent nature of the crunch later.

Figure 2

Table 3

Second, according to survey data from the American Council of Life Insurers (ACLI), the share of total commitments by life insurers to below-investment-grade private placements dropped sharply in mid- 1990, from 21 percent in the first half of the year to 11 percent in the second half (Figure 2). Since then, this share has never risen above 7 percent. While data are unavailable on a continuous basis before 1990, Shapiro (1977) reports that the average annual share of commitments going to belowinvestment-grade bonds between 1960 and 1975 was 19.9 percent. In other words, starting in mid-1990, there was a historically unprecedented shift in insurers' investments away from below-investment-grade private bonds.

Consistent with the reduced rate of purchase of below-investment- grade bonds, life insurance companies' holdings of these securities fell 11 percent in 1991, whereas holdings of investment-grade securities rose by nearly 12 percent. As a result, as shown in Table 3, belowinvestment-grade private bonds as a percentage of all private placements in insurance company portfolios declined from 19.8 percent in 1990 to 12 percent in 1993 (and to 10 percent by year-end 1995). As private bonds are infrequently sold in the secondary market, this sharp decline in outstandings is consistent with an abrupt cessation of new investments in belowinvestment-grade private bonds. Life insurance companies appear to have simply let their portfolios of such bonds run off without replacing them. Table 3 illustrates that this aversion also extended to the public market in the early 1990s--holdings of below-investment-grade public bonds as a share of total public bonds fell from 6.8 percent in 1990 to 3.7 percent in 1992.14

Figure 3

Accompanying the decline in issuance and outstandings was a sharp increase in yield spreads on below-investment-grade private bonds. According to market reports, before 1990 the difference in yields on BB- and BBBrated private bonds with comparable terms was about 100 basis points; since then, the difference has been as high as 250 basis points.15 Although data are unavailable before 1990, the spreads reported in the ACLI survey confirm this movement (Figures 3 and 4).16 During the first half of 1990, the spread between yields on BB-rated private placements and comparable Treasury securities was just over 300 basis points, compared with just over 200 basis points for BBB-rated privates. This implies a difference in yields between BB- and BBB-rated bonds of about 100 basis points, consistent with market reports of the "normal" spread between such bonds at the end of the 1980s. During 1991-93, however, the spread over Treasuries on BBrated privates rose sharply to around 350 basis points (peaking at 425 basis points in early 1991), while the spread over Treasuries on BBB-rated privates actually fell somewhat.17 The yield spread between BBB- and BB-rated bonds thus rose to between 130 and 220 basis points over this period. Note again that spreads between BB- and BBB-rated private bonds remained between 180 and 200 basis points through 1995 and 1996.

Of course, one could argue that the increase in spreads over Treasuries for BB-rated private bonds in late 1990 and 1991 largely resulted from the slowdown in economic activity. The recession could have increased borrower riskiness, and life insurers could have demanded higher interest rates in response. However, such an argument does not account for the fact that spreads over Treasuries on investment-grade private bonds actually declined in the recession, as shown in Figure 3. This pattern of behavior is not observed in the previous recession, when spreads over Treasuries of investment-grade bonds rose, and in fact rose by a greater amount than spreads on below-investment-grade bonds.18 This argument would also fail to account for the continuing high spreads on BB-rated securities during the expansion that followed the 1990-91 recession. Overall, it appears more likely that, within the below-investment-grade sector of the private placement market, for a given level of risk, loan prices went up, whereas the volume of loans went down. These facts are consistent with a **credit crunch** in this market.

Mechanisms behind the **credit crunch**

The mechanism behind the **credit crunch** in the private placement market is somewhat different from those that have been proposed in the research literature. This section briefly reviews the literature on credit crunches and contrasts it with the mechanism that I argue is behind the recent **credit crunch** in the private placement market.

One branch of the literature on credit crunches focuses on reductions in intermediaries' lending activity caused by regulatory actions that affect lenders' ability or incentives to assume certain risks. For example, Bernanke and Lown (1991), Clair and Tucker (1993), Berger and Udell (1994), Peek and Rosengren (1995), and Brinkman and Horvitz (1995) examine the effect of overzealous bank examination and the imposition of risk-based capital requirements on banks as a reason for the slowing of bank lending in the early 1990s. Banks facing binding capital constraints as a result of large loan losses, low earnings, and the introduction of higher regulatory requirements for capital levels had three options for increasing their capital-asset ratios: raise new capital, shrink assets and thereby liabilities, or change the mix of assets to include more government securities and fewer loans to businesses.19 The latter two choices involve cutting back lending to borrowers. More aggressive examination practices that forced banks to make excessive charges against capital and accept new credit risks more cautiously would have a similar effect.

Another branch of the literature focuses on a decline in indebted firms' net worth and the value of their unencumbered collateral as a reason for a contraction in financial intermediary lending. Bernanke and Gertler (1989) suggest that borrowers' net worth can affect lending activity by financial intermediaries. As borrower net worth declines, then the agency costs of external finance rise. Thus lenders will be increasingly unwilling to lend to firms as their net worth declines. Shocks that impact firm net worth negatively can thus produce credit crunches.

Figure 4

A third branch of the literature focuses on contractions of lending by intermediaries caused by liquidity problems, as modeled by Diamond and Dybvig (1983). In their model, a bank transforms illiquid assets into liquid deposits. Although bank assets are riskless, there is a cost to turning them liquid. Thus a bank run can still occur if depositors conjecture that all other depositors will withdraw their deposits early and consequently run to the bank to close their accounts before the bank exhausts its assets. Since the bank's assets are riskless, however, runs are not caused by rumors about the bank's solvency. Instead, runs arise as a random phenomenon, like sunspots. However it is caused, the effect of a run is the same--the bank must liquidate its illiquid loans and contract lending activity.

A final branch of the literature focuses on contractions in intermediaries' lending caused by runs due to liabilityholder concerns about financial intermediaries' solvency. Chari and Jagannathan (1988) and Gorton and Calomiris (1991) model situations where bank assets are risky. Some depositors have private information about the value of the bank's assets, while others try to infer this information from the number of depositors who line up at the withdrawal window. If there is a long line, these depositors will (sometimes incorrectly) infer bad news about the value of the bank's assets and this will trigger a bank run, which in turn triggers a sharp contraction in bank lending.

As I argue in the next section, the mecha nism behind the **credit crunch** in the private placement market was largely unrelated to the liquidity-based models of runs and was not associated with a decline of indebted firms' net worth or regulatory action.21 It was most closely related to the last class of models, which focuses on runs caused by liabilityholder concerns about financial intermediaries' solvency. However, unlike in these models, no actual runs occurred to trigger a flight to quality by an insurance company: the mere threat that potential customers were focusing on an insurer's below- investment-grade bond holdings was enough to trigger a withdrawal from the market for these securities. Thus, the signal to liabilityholders provided by the length of the line at the withdrawal window was not crucial, because most life insurers did not experience runs. What was crucial was the perception that the share of below- investment-grade bonds on the insurer's books was impeding the ability to sell life insurance policies to potential customers and hurting the firm's stock price. The next section reviews the flight-to-quality mechanism behind the **credit crunch** .

The flight-to-quality mechanism in the private placement market22

Until the early 1990s, the life insurance industry had enjoyed a long-standing reputation for financial stability. In 1990, however, concerns arose about the financial state of some life insurers when two insurance companies announced large write-downs of their bond and commercial real estate portfolios.23 In 1991, five life insurance companies were seized by regulators.24 Of these, two had large exposures to below-investment-grade bonds, and one had heavy exposures to commercial real estate.

In 1991, life insurers also became subject to more rigorous disclosure requirements with regard to their below-investment-grade holdings. In 1990, the National Association of Insurance Commissioners (NAIC) revised its system of rating bonds held by life insurance companies to more closely resemble those of the major credit rating agencies. As shown in Table 4, under the old rating system, bonds that would have been rated below-investment-grade by the major ratings services--BB or below-- were often rated investment grade (a "Yes" rating) by the NAIC for regulatory purposes. A "Yes" rating under the old system could be given to securities rated from AAA to B, while a "Not," "No**," or "No" rating could be given to securities rated from BB to those in default. Under the new system, all bonds rated belowinvestment-grade by the major ratings agencies were rated below-investment-grade by the NAIC. NAIC-1, the top rating, was given to securities rated AAA to A, NAIC-2 to BBB securities, NAIC-3 to BB securities, and NAIC-4 to B securities.

Table 4

The first balance sheet data (from 1990) incorporating the new ratings were released in spring 1991. Although life insurance company investments in below-investment-grade bonds had changed little from 1989, the new system made it look as if there had been a huge jump in life insurance company exposure to belowinvestment-grade bonds. From 1989 to 1990, reported below-investment-grade holdings of the life insurance industry rose 40 percent and, as a share of all corporate bond holdings, increased from 15 to 21 percent. The sudden appearance of larger below-investment-grade holdings by life insurance companies focused the attention of regulators, stock investors, the media, advisors to the institutional buyers of life insurance products, and policyholders themselves on the composition of insurers' bond holdings. Below-investment-grade bonds became a source of concern for these constituencies, with the ultimate result that insurance companies ceased investing in them.

Fenn and Cole (1994) document that stock prices of insurance companies with higher than average concentrations of junk bonds were adversely affected by the publicity surrounding First Executive's write-down of its bond portfolio in early 1990.25 In contrast, stock prices of insurance companies with lower than average exposure to below-investment-grade bonds were not affected.

The media also reacted unfavorably to those insurers with large holdings of belowinvestment-grade bonds. DeAngelo et al. (1994) suggest that First Executive--whose financial problems stemmed from overexposure to belowinvestment-grade bonds--received much more press coverage than other large life insurers with serious financial problems stemming from other reasons at the same time. They report that from July 1989 to April 1991, thirty-two feature articles on First Executive appeared in four major newspapers. Over the same period, there were only seven feature articles on any of the industry's top ten companies, despite the fact that, during this period, other life insurers suffered substantial financial problems unrelated to their below-investment-grade bond investments.

Finally, potential customers of life insurance companies became sensitive to the share of below-investment-grade bonds held by insurers. Fenn (1995) finds evidence indicating that life insurance companies' asset growth from 1990 to 1993 was extremely sensitive to their below-investment-grade holdings. Consistent with this finding, life insurance companies began to market themselves to policyholders on the basis of their below-investment-grade bond holdings. Insurers began to advertise explicitly their low exposure to below-investment- grade bonds in print and television media (see Lublin 1990).

Of course. much of this activity would have been warranted had below-investmentgrade bonds truly been a serious problem for the life insurance industry. However, Fenn (1995) suggests they were not and that the use of below-investment-grade bond holdings as a signal of insurance company solvency problems was probably not warranted. First, belowinvestment-grade bonds were actually only a small factor in life insurers' asset quality problems: none of the largest twenty life insurance companies had more than 10 percent of their general account assets in the form of belowinvestment-grade bonds. Far more serious was the industry's sizable exposure to commercial real estate: in 1990, only two of the twenty largest life insurers had less than 15 percent of their general account assets tied up in commercial real estate. In 1990, the largest twenty life insurance companies together held 31 percent of their general account assets in real estate, versus under 6 percent in (public and private) below- investment-grade bonds.26

Second, the slump in the commercial real estate market was longer and deeper than in the below-investment-grade market. Fenn (1995) reports that commercial real estate prices fell 24 percent between 1990 and 1992. In some regions of the country, prices fell by considerably more. In contrast, Fenn reports that public below- investment-grade bond prices fell 9 percent from 1989 to 1990 and then recovered sharply in 1991 and 1992. No data are available on prices in the private bond market because these bonds are rarely traded on the secondary market, but there is little evidence that default rates increased sharply in this period for private placement below-investment-grade issuers.

Regardless of whether the share of belowinvestment-grade bonds on an insurer's books was an accurate signal of its financial condition, there is evidence that the media, the stock market, and life insurance companies anticipated (correctly) that policyholders would be especially sensitive to this signal. The result was an almost complete withdrawal by life insurers from the below-investment-grade sector of the private placement market in 1991 and 1992.

Reasons for the persistence of the crunch. One surprising aspect of the **credit crunch** is its persistence. Data on issuance and yield spreads in Tables 2 and 3 and Figures 2, 3, and 4 suggest that the **credit crunch** in the private market is an ongoing phenomenon six years after it started. This is in stark contrast to the public bond and bank loan markets, which revived as long ago as 1993 and are now very active markets for firms seeking funds. Why has the private placement market been special in this regard?

It is unlikely that insurance companies still feel the need to advertise low below-investment-grade bond exposure. Possibly this was true as late as 1993, but it is hard to believe that it is still the case. Concerns about life insurance company financial stability appear to have disappeared: the financial condition of the industry has improved significantly since 1992, and capital-asset ratios for the industry are at their highest level in almost a quarter of a century. In any case, life insurers appear no longer averse to investing in below-investment-grade public bonds. As illustrated in Table 4, over the last three years, insurance companies have increased the share of their public bond investments going to below-investment-grade issues. At year-end 1995, the industry's 8.4 percent share was higher than it had been in 1990.

One reason may lie in the influence of risk-based capital standards, which became effective at the end of 1993 and which may have reinforced the reluctance of insurance companies to buy below- investment-grade securities. The new standards are aimed at measuring the prudential adequacy of insurers' capital as a means of distinguishing between weakly and strongly capitalized companies. To this end, insurers must report the ratios of their book capital to levels of capital that are adjusted for risk. As an insurer's ratio falls progressively below one, successively stronger regulatory actions are triggered. One way insurers can raise their risk-based capital ratios is to shift into lower risk assets, and below-investment-grade securities carry risk-weights much higher than those on investment-grade bonds and even commercial mortgages. While the introduction of risk-based capital standards may in part explain insu rers' continued reluctance to invest in below-investment-grade private bonds, it is unlikely to be the whole story, since insurers have returned to the public belowinvestment-grade market, and the capital standards do not discriminate between private and public bonds.

The change in the composition of life insurers' assets between those held in general accounts and separate accounts may partly explain insurers' investment behavior. Insurers' separate account assets are held apart from their general account assets. All gains and losses of a separate account are directly attributed to the policyholders of that account. Separate account assets have grown much faster than general account assets since the early 1990s, when concern about insurers' financial stability first arose.27 However, the shift from general to separate account products may have impeded the industry's traditional lending activities, since separate account assets must be marked-tomarket and therefore consist primarily of liquid assets such as public bonds and publicly traded equities. Public below-investment-grade bonds are considered significantly more liquid than private below-investment-grade bonds and are thus more suitable assets for separate accounts.28

It is possible that the recent proliferation of below-investment- grade public bond investors has "cherry-picked" the better credits from the private market, thereby substantiating the need for permanently higher spreads in the private market. However, as discussed above, the public and private bond markets are very different debt markets, and for many firms there is a limited scope for switching between them. Thus, this is unlikely to be the whole story for the persistence of high spreads and low insurer interest in this market.

A final reason has to do with the information-intensive nature of the private market for below-investment-grade issues and the high start-up costs facing many insurers that might consider getting back into the belowinvestment-grade sector of the private market. At the height of the **credit crunch** in 1991 and 1992, many life insurance companies scaled back substantially on their credit staffs, which are necessary for investing in the most information-problematic private bonds in the below-investment-grade sector. Many insurance companies may now be reluctant to incur the start-up costs associated with expanding their risk-control resources, particularly if they feel there is some likelihood of the same policyholder focus on below- investment-grade bond holdings when the next downturn in the industry occurs.29

Conclusions

The **credit crunch** in the private placement market is an example of a flight-to-quality mechanism at work. Private placements are information-intensive securities that require substantial due diligence and monitoring by intermediaries in order to ascertain their value. They make up a substantial portion of life insurance company assets; these companies are therefore vulnerable to the flight-to-quality mechanism because, unlike banks, their liabilities are not insured. Financial problems at life insurance companies, a change in regulatory reporting requirements, and runs on a few insurers combined to raise doubts about the solvency of life insurance companies and focused regulatory, media, stock market, and public attention on the share of life insurance company assets in below-investment-grade bonds as a signal of solvency. Life insurance companies, therefore, began to compete with each other on the basis of this share. This created a large-scale withdrawal from the market for below-investmentgrade bonds, creating a **credit crunch** in this segment of the private placement market. Ironically, it is likely that the share of belowinvestment-grade bonds on an insurer's books was not a very good signal of its solvency. But the information-intensive nature of the securities meant that outsiders could be misled in this regard.

The existence of a mechanism that could induce the **credit crunch** in the private placement market does have some more general implications. Flights to quality by

U.S. commercial banks have been rare since the advent of deposit insurance. However, this might change if recent proposals for "narrow" banks are enacted. Under these proposals, banks would be split into two parts: a narrow bank that would be fully insured, provide payments system services, and invest only in Treasury securities; and a "broad" bank that would raise uninsured funds in the open market and invest in traditional bank loans. Although the payments system would be fully insured under this system, broad banks might be an unstable source of funds for firms as they would be subject to the kind of flight-to-quality mechanism I've described for life insurance companies. A fuller understanding of the role of deposit insurance in promoting stable financial intermediation is necessary before the welfare effects of narrow bank proposals can be fully analyzed.

Notes

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1 "Information-intensive" refers to the requirement that due diligence be performed by the lender at the time of loan origination and monitoring be done thereafter. "Information-problematic" borrowers are those that pose particularly severe information problems to lenders, which must consequently engage in costly due diligence and monitoring to evaluate and control the credit risk of the borrower. Although I focus on the traditional market, the Rule 144A market has become quite significant, totaling almost 50 percent of gross issuance in 1995. Of course, this implies that in terms of net new funds raised, the private market is even more important than the gross issuance numbers suggest. 4 Outstandings of public bonds are the sum of bonds rated by Moody's Investors Service and publicly issued medium-term notes. Private placements are estimated by subtracting the figure for public bonds from outstandings of all corporate bonds reported in the Flow of Funds accounts. Data for bank loans are from the Flow of Funds accounts. Further, bank loans tend to have maintenance covenants, whereby the criteria set forth in the covenant must be met on a continuous basis (at the end of each quarter, for example), whereas private bonds tend to have incurrence covenants, whereby the

criteria must be met at the time of a prespecified event, such as an acquisition or the issuance of new debt. See Carey et al. (1993). Kwan and Carleton (1996) report that over half of a sample of private placements were renegotiated at least once, with most of the renegotiations occurring for loans in good standing. See American Council of Life Insurance (1996). This reflects both the general concentration of the life insurance industry-the twenty largest life insurers hold about 50 percent of total industry assets-and the fact that large lenders have an advantage in investing in private placements because their large investment volume allows them to participate continuously in the market, giving them up-to-date information on pricing. 9 See also Carey et al. (1993) for a discussion of this phenomenon. This also contributed to a crunch in the public belowinvestment-grade market, where life insurance companies were also significant lenders (but not nearly so dominant as they were in the private market). 11 This definition is similar to that of Bernanke and Lown (1991), who in their analysis of the **credit crunch** in the bank loan market in the early 1990s define a crunch as "a significant leftward shift in the supply of bank loans holding constant both the safe real interest rate and the quality of potential borrowers." The decline of issuance may or may not have been achieved by nonprice rationing: I have no quantitative evidence either way. Interviews with market participants on this topic revealed mixed views. Gross issuance excludes offerings to finance employee stock ownership plans and restructurings. Underlying developments are more evident with their exclusion, as both were heavy in 1989 but fell off sharply in 1990 and 1991. Also excluded are Rule 144A offerings. Before 1990, ratings reflected the judgment of agents supplying information on the transactions they assisted. Thereafter, ratings assigned by the National Association of Insurance Commissioners are used. '4 Note, however, that unlike in the private market, life insurance companies appear to have returned to buying below-investment-grade public bonds in recent years. See Carey et al. (1993). BBB-rated bonds are the lowest investment-grade rating category, while BB-rated bonds are the highest below-investment-grade rating category. Care must be used in comparing the reported spreads. Although they are transaction prices, they do not reflect a standardized security. As noted in the first section of the article, the nonprice terms of private placements can differ widely for bonds carrying the same credit rating, and the terms affect the yields. For example, at any given moment, the difference in spreads between the highest-risk BB-rated issue and

the lowest-risk BB-rated issue may be as much as 150 basis points. Under normal circumstances, averaging spreads within a rating category produces a representative spread for the rating. However, as most of the BB-rated bonds issued since mid-1990 probably were at the least-risky end of the BB risk range, the increase in the BB spread shown in Figures 3 and 4 probably understates the actual increase. Similarly, the spread on A-rated private bonds also declined during 1991-93. In the 1981-82 recession, spreads over the 7-year Treasury on A- and BBB-rated bonds rose by 60 and 52 basis points, respectively, over their level for the twelve months prior to the recession, while those on BB-rated bonds rose by 45 basis points. These spreads are for public bonds; data for private bo nds are unavailable. Risk-based capital may be viewed as a regulatory tax that is higher on assets with higher risk-weights, encouraging substitution out of assets in the 100 percent risk category-such as commercial loans-- and into assets in the zero risk category-such as Treasury securities. In this case, the phenomenon would not qualify as a **credit crunch** as I have defined it, since the risk of the borrower presumably increases as net worth declines. However, regulators were probably at least partly responsible for the flight to quality to the extent they promulgated bad news to the public about belowinvestment-grade bonds. 2 Much of the information in this section is from Fenn (1995). First Executive wrote down its bond portfolio by $515 million in January; in October, Travelers reserved $650 million for anticipated commercial real estate losses. The five were Executive Life and Executive Life of New York (both insurance subsidiaries of First Executive), First Capital and Fidelity Bankers (insurance subsidiaries of First Capital Corp.), and Mutual Benefit. Although they document that insurance company stock prices also fell in response to Travelers' announcement of $650 million in commercial real estate losses, the price declines were only about one-quarter the size (per unit of investment in below-investment-grade bonds or commercial real estate). Rating agencies downgraded more than half of rated life insurance companies in 1991 and 1992, mostly for reasons of commercial real estate exposure. This is primarily because separate account policyholders have a preferred claim on separate account assets and are therefore afforded greater protection if an insurer defaults. 28 This of course has implications for how banks might behave if forced to implement market-value accounting for their assets. In such circumstances, illiquid commercial loans would be viewed as more costly relative to liquid Treasury securities.

The fact that other potential investors in below-investment-grade private placements-such as pension funds and finance companies-have not dramatically expanded their role as lenders to take advantage of the high spreads is evidence that there are likely to be high start- up costs to entering this market.

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